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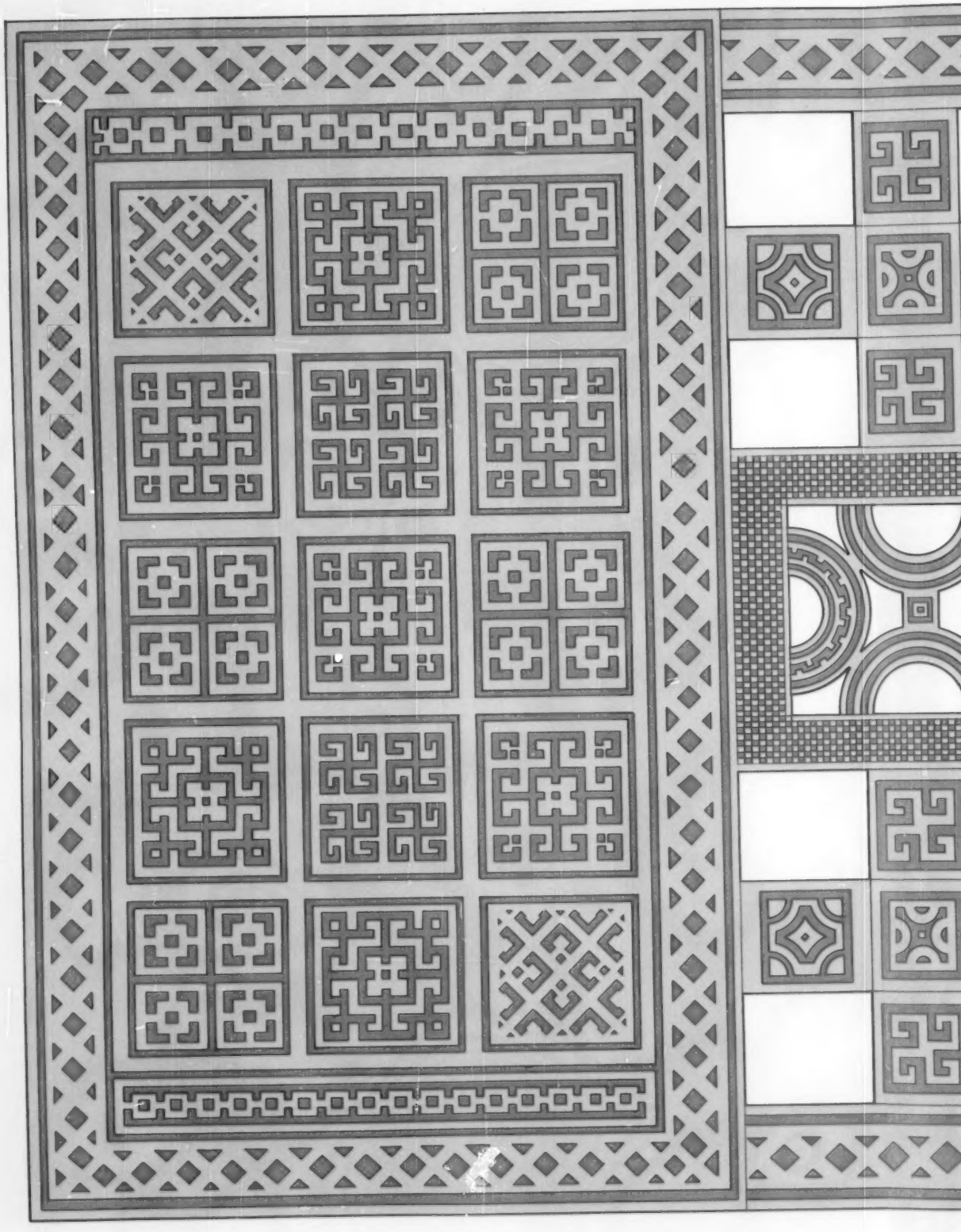

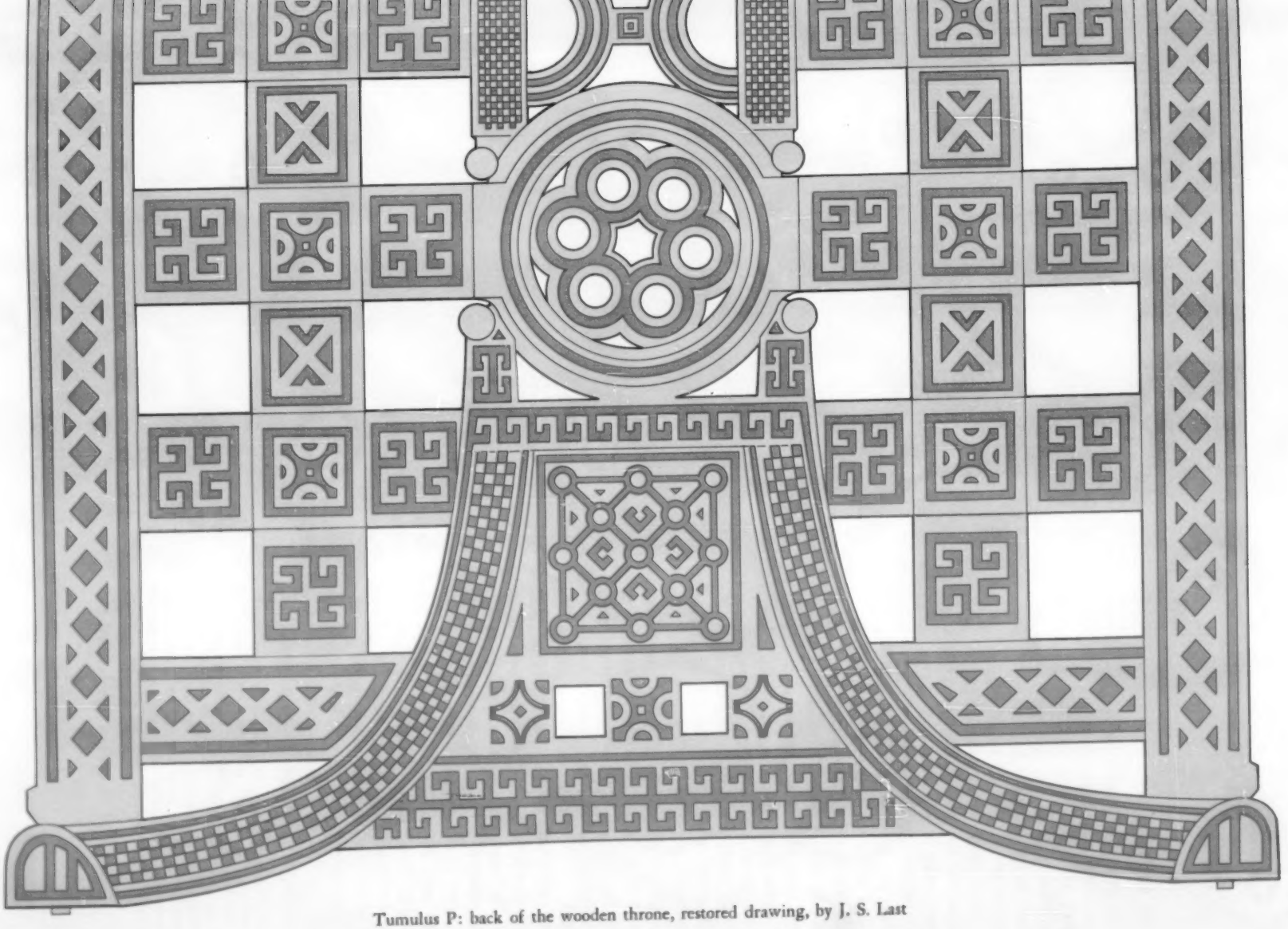

Tumulus P: back of the wooden throne, restored drawing, by J. S. Last

# Gordion 1956: Preliminary Report

RODNEY S. YOUNG

PLATES 87-96

The fifth excavation campaign of the University Museum at Gordion began on April 1, 1956, and continued until the end of August. Work this year was on a relatively small scale, and was divided between the city mound, the lesser mound to the southeast of it, and the cemetery.[1] The ancient road found in the fall of 1955 was further investigated and a short sample stretch was laid bare just to the east of the great tumulus (pl. 87, fig. 1). Its width of 6.25 m. is uniform, as is the curbing of stone along both sides. A spine or ridge of small stones down the center divides it into two lanes. Toward the east it could be traced for only a short distance, to the edge of cultivated fields; but farther away in the same direction its course may be picked up in several places in the barren hilly country. The road passes close by the village of Beyces in which there is a small ancient habitation mound; still farther to the east it may be picked up again heading for Kara Hüyük, a large mound near the Yeni Doğan railroad station, and the peasants who cultivate the land at the foot of the mound report that they have found traces of the road passing close by. This was evidently, then, a trunk road which linked the various ancient settlements and in all probability went eventually to Ancyra (Ankara), an important center as early as Hittite times. Toward the west it probably followed the valley of the Tembris (Porsuk) to Dorylaion (Eskişehir). At Gordion we have traced its course half-way across the flood plain of the river; it seems to have bypassed the town at the north, probably with spurs leading to the various gates. The road is presumably post-Phrygian and pre-Roman; probably a part of the road-system of the Persian Empire, which must have followed in general the courses of more ancient roads, Phrygian and Hittite.[2]

On the city mound at Gordion the area within the main gate had for the most part been cleared in previous campaigns to the level of the Persian town. Within the gate lay a large court containing six buildings and divided from the rest of the city by a screen-wall with an opening in the course of its west side to give access to the inner area.[3] The southwest corner of the enclosing wall had not been cleared in 1955, and the inner gate or pylon had not been examined. Digging in 1956 proved the corner of the enclosure to lie exactly where it had been anticipated, though all the cut blocks of the wall had been plundered and only the rubble bedding, 4 m. in thickness, remained. The west wall of the enclosure ran in a continuous straight line; from it the buildings in the gate-court had taken their orientation, ranged to either side of an avenue leading from the city gate to the inner pylon. The latter proved to be a small building 7.90 m. wide and 7.50 m. deep, its sides formed by westward returns of the screen wall of the gate court (pl. 87, fig. 2). The inner (west) side of the building lay at a level slightly higher than the outer and was approached by a flight of three shallow steps in front of a cross-wall in which there must have been doorways which could be closed. The foundation for the cross-wall is preserved, though tumbled about. A block at the south side bears in its upper face the bed for a vertical wooden post, perhaps for the frame of a side doorway. A number of step-blocks of stone, found built into the sides of a later pit close by, may reasonably be assigned to the small pylon. The building has been very thoroughly plundered and most details are now lacking. One would like to assume that it was roofed, and to restore, on the analogy of Building A and the side courts of the Persian gate building, one or more wooden pillars

[1] The present writer was again Field Director, with the able assistance of Raci Temizer, Commissioner representing the Turkish Department of Antiquities. J. S. Last of Episkopi, Cyprus, was architect, and Ann K. Knudsen of the University of Pennsylvania was in charge of records. Machteld Mellink came in June to dig on the smaller mound, and Mabel Lang to work on the wooden objects from Tumulus P. J. R. McCredie, a student at Harvard, spent the summer doing photographic work, and Garrett Copeland followed the drilling of the biggest tumulus.

[2] In Roman times the main road to the interior probably ran farther to the south, from Dorylaion to Pessinus and so to Ancyra, as the modern road runs from Eskişehir to Sivrihissar to Ankara. By this time the towns beyond the mountain ridge to the north and in the valleys of the Sangarios and the Ankara rivers would seem to have lost their importance. On the course of a road in this area in Hittite times, see J. Garstang, "Hittite Military Roads in Asia Minor," *AJA* 47 (1943) 35f.

[3] *AJA* 60 (1956) 254f and pl. 84, figs. 14-15.

in each façade to lessen the span of the roof and to give a more monumental quality to the approach to an area set off from the rest of the town for administrative or religious purposes.

A deep cut between Persian Building G and the enclosure wall to the west of it laid bare the remains of part of a house of the Phrygian period about three meters below the Persian level. These remains indicated a house in a relatively good state of preservation and undisturbed beneath a heavy deposit of burned debris from its own destruction. Building G and the small Painted House were therefore taken out, in order to reach the level below, and subsequently it became necessary to take out also the enclosure wall to the south of the pylon. Of Building G later plunderers had left only one block at ground level and all that remained was its rubble bedding. The Painted House was drawn and recorded before being taken out. The west enclosure wall proved to run across the middle of a Phrygian megaron, which could not be cleaned without its removal. Digging under all of these later constructions showed their beds to go down to the level of a heavy burned stratum, about 1.20 m. in depth, which overlay the Phrygian buildings below. The space between the beddings of the later buildings had been filled with clay; the whole of the later level had been bedded directly on the destruction fill of the earlier and there was no trace of an intervening stratum of the seventh and early sixth century (Lydian period).

The plan (pl. 88, fig. 3) of the Phrygian level as cleared thus far shows the relation of the houses to the city gate. It may be noted that further excavation has shown a shallow porch in front of the north wing of the gate complex, of which only the foundations now remain. The "Polychrome House"[4] or inner gate building is later than the gate proper, and one is tempted to assume that the paved area lying to the west extended originally as far as the Phrygian gate building. The blank area on the plan between the south wing and the houses to the west is still occupied by Persian Building C, and has not been cleared.

One complete Phrygian house has been exposed, the "Burned Phrygian Building," together with most of a second building—the "West Phrygian House" lying beside it to the west, and part of a third, later, house behind both at the south—the "South Phrygian House" (pl. 88, fig. 4). Beside the Burned Phrygian Building at the east lies the wall of another Phrygian complex, still covered by Building C. Where blocks of its wall are missing one may see that the outer face of the east wall of the burned building is covered with clay plaster, and that this wall is therefore later than the building and added against its east side. That the South Phrygian House was also a later addition is shown by the way in which the end of its north wall, overlapping the southeast corner of the West Phrygian House, covered some pictures scratched on the wall-face of the earlier building while it was still exposed. The addition of a later house at the south blocked off the passageway which originally ran between the burned building and the West house, and left a long narrow area behind the burned building. These narrow areas to west and south[5] of the burned building, rendered useless for purposes of circulation, were then converted into small storerooms, two at the south and two at the west, by the addition of cross walls of crude brick. These are shown to be additions by the way in which their ends abut against the faces of the earlier walls.

The complex of houses is thus shown to belong to two, or possibly three, building periods, which may have covered a considerable extent of time. All were destroyed, however, at the same time, and by a fire which was probably part of the general conflagration that brought an end to the Phrygian town.[6] The pottery found over the floors of all the burned houses and in great abundance in the South house may be dated with some assurance in the early seventh century. The destruction of the town may have therefore come in consequence of a raid of the Kimmerian barbarians who were active in Asia Minor at that time. The houses, destroyed in the first quarter of the seventh century, must have been built in the eighth—the South house perhaps toward its end, the others somewhat earlier, though how much earlier it is impossible at present to say.

### BURNED PHRYGIAN BUILDING

The burned Phrygian building, as may be gathered from the above, was originally a free-standing

[4] *AJA* 60 (1956) 260f.

[5] It should be noted that the true orientation of the buildings is northeast to southwest; but for convenience the major points of the compass are given, and the houses referred to as facing north.

[6] The same fire was noted at the same level in 1955 in a trench to the west; cf. *AJA* 60 (1956) 262.

unit facing on the paved area at the north, with a passageway for circulation between it and the house at the west, and with open space to south and east. Its over-all dimensions are about 9.50 by 17.50 m. It was built of crude brick strengthened by a framework of vertical wooden posts and horizontal wooden beams in both faces of the walls, tied together at intervals by cross-ties running through the thickness (pl. 89, fig. 5). In general the walls are preserved to a height of about 1 m. above the floor, or to the level of the first horizontal beam set in their faces. They are divided into alternating "piers," roughly square, and "niches," oblong recesses where the vertical posts have burned out. Each niche seems to have contained not a single post but a pair of wooden verticals filled between with broken brick. The posts or verticals did not extend to the full height of the wall, as might have been expected; instead they ran only to the level of the horizontal beams. The second layer of brickwork, between the first and second horizontal beams (probably nine courses of bricks) had its own series of wooden verticals, placed above the "piers" of the lower layer. This may be seen at the southwest corner of the building outside, where the second layer of brickwork passes right across the top of one of the post-niches below, and the actual corner, of brick below, shows a gap where the wood has burned out above (pl. 89, fig. 6). The wooden strengthening thus consisted of series of oblong timber frames with the verticals of each layer falling above the solid brickwork of the layer below. A careful search for nails of bronze or iron revealed none; the timber framing must have been fastened together by an elaborate system of mortising.

The building was entered from the paved area at the north evidently by two doorways, symmetrically placed. Although the whole of the north wall has disappeared down to its foundations, the positions of the two doorways are suggested by two gaps in the edge of the stone paving outside (pl. 89, fig. 5). The extreme burned condition of the vertical faces of the paving slabs around three sides of these gaps suggests that not more paving stones but door sills of wood or other inflammable material are to be restored here. These gaps, symmetrically placed and almost identical in size and shape, are the only indications left of the positions of the doors.

The house was divided inside into two rooms by a cross-wall through which a wide doorway gave the only means of access to the inner (south) room. Again the cross-wall has disappeared down to its foundations, except at its west end; but two sockets in the edge of the floor of the outer room (plan, fig. 4) must have held the lower ends of the doorposts, and give the position of the doorway. The exact center of the outer room is occupied by a round hearth of stucco 1.51 m. in diameter, with a shallow drafting around its edge. The room was paved with a floor of pebble mosaic showing geometric designs in red and black on a white ground, but now in an extremely poor state of preservation. The larger north room (8.30 by 7.75 m.), floored with hard white plaster, also contained a round hearth of stucco 1.46 m. in diameter, laid on the central axis of the room but slightly to the north of its cross-axis. The walls of both rooms had been covered with fine lime plaster in a thick layer, some of which still adhered to the surface of the "piers" of brickwork. It probably covered and concealed the wood of the framework also. The heat of the fire that destroyed the building was so great that the plaster was vitrified; in places it became semi-liquid and started to run downward. The burning timber of the framing must have added to the intensity of the flames, but the greatest amount of fuel probably came from the fallen roof. Over the floor throughout the building lay large pieces of charcoal from the roof-beams, and masses of burned reeds from a reed-layer which overlay the beams. The reeds had been coated outside with a layer of clay; lumps of this were also found, baked hard in the fire, and bearing on one face the imprint of the reeds over which the clay had been laid when soft.

The storerooms at south and west, later additions as noted above, may have belonged to the Burned Phrygian Building. The area to the south of it was divided by three added cross-walls into a small storeroom at the east and a larger one at the west. In the absence of any doorways one must assume that access to these was from above. They contained, along with masses of rather coarse pottery, a pair of clay lamps of the deep saucer variety, with open nozzle at one end and half-round cut-outs at either side, perhaps for additional wicks. At the east end of the larger room were two pithoi, one of which contained burned wheat, the other a large jug full of astragals. In the small room part of a charred basket of wickerwork lay under a heap of several

bushels of the barley it had contained. To the west lay one storeroom, partly paved with stone slabs. The room to the north of this may have been a kitchen; at its north end stood a horseshoe-shaped oven or fireplace of crude brick, with a bin beside it for the storage of fuel.

WEST PHRYGIAN HOUSE

The somewhat larger and more elaborate building at the west was built of stone instead of crude brick, but employed the same system of timber framing to strengthen its walls, which were 2 m. thick with faces of squared poros blocks filled between by rubble. As may be seen by the plan, fig. 4, the building has not yet been entirely cleared. It consisted of a deep porch or vestibule at the north, fronting on the open paved area, and a large inner room with central hearth, measuring 10.85 by 9.74 m. Between the vestibule and the main room there was a deep central doorway flanked at either side by a shallow niche-like room or closet, opening to the vestibule. The north wall, dividing the vestibule from the pavement outside, is preserved only in its bedding, a narrow trench about the width of a single crude brick (32 cm.). This at best cannot have been more than a screen wall, standing perhaps to considerably less than the full height of the building. Wooden pillars to support the roof are needed in the north façade, and perhaps their beds will appear in ensuing campaigns when the northern end of the house can be cleared. The timber framing of the stone building differed slightly from that of the brick: horizontal beams set just above floor level ran between the niches for large vertical posts, which were bedded below floor level, and intermediate small vertical timbers were set upon the horizontals (pl. 89, fig. 7). The walls were covered with good white lime plaster in at least three layers, which probably concealed the timber framing. The hearth, similar to those in the brick building, lay on the main axis of the room, but to the north of its cross-axis; its diameter was 1.98 m. The interior walls of the building were of crude brick laid on timber beddings. A good deal of the charred wood is still left, holding its shape sufficiently so that something of the carpentry work of the doorframes can still be made out. The east "closet" beside the doorway is shown in pl. 89, fig. 8, from the west; its floor of pebble mosaic, at a slightly higher level than the floors of the vestibule and the megaron room, was in part supported on timbers running through its width. Details of the wood construction are shown in pl. 90, fig. 9; to the left of the crude brick wall which divided the doorway from the east closet may be seen a bed for a vertical post, and beside it a long groove or slot. The former must have held the lower end of the doorpost, and the latter the lower ends of the planks which sheathed the side of the doorway, no doubt fastened to horizontal beams running between the vertical posts. Along the north side of the east closet the stumps of uprights were preserved, giving the approximate width of the doorway through which it was connected with the vestibule, and between these cuttings on the upper faces of the timbers suggested the bed for a wooden step leading up to the higher level of the closet.

All the rooms of the West Phrygian House were paved with pebble mosaic. The megaron room, with the exception of the hearth and an oblong area in the southeast corner, was floored by a mosaic of dark blue, dark red, and white pebbles in a bed of clay (fig. 7). The designs were almost all geometric motives laid out at random, with no over-all design fitted to the room or to the hearth at its center. The designs include key pattern, swastikas, lozenges, interlocking triangles, and large rosettes; the general effect is like that of an oriental rug. In some places designs of slightly different color or with interrupted edges suggest that the floor had at some time been repaired by patching; the same was noted to a greater degree in the mosaic floor of the north room of the Burned Phrygian Building. The floor, intact except for small irregular patches where the pebbles are missing but their bed is continuous, shows no trace of beddings for wooden posts or other interior supports. The roof must therefore have spanned the room from side to side, a clear area of 9.74 m. The burned debris over the floor, including fragments of charred beams, burned reeds, and lumps of clay with reed impressions, indicate a roof like that of the Burned Phrygian Building; presumably there must have been an opening over the hearth to let out the smoke.

In the southeast corner lay an oblong area bordered by charred beams and filled with loose pebbles. A small pithos found over the pebbled surface may have been used to store liquids for use in the megaron room; the loose pebble bed would have served to drain away any spilled liquid. The area is hardly suitably placed as the bed for a throne, as in the

Bronze Age Greek megaron at Tiryns or at Pylos.

The east side of the West Phrygian House is the only one that has been entirely cleared. For its entire length outside a low wide bench or ledge of stone, covered with mud stucco, had been built against its face (plan, fig. 4). Above the level of the bench the wall had almost entirely fallen outward toward the east at the time of the destruction, but at the south and north ends blocks still in place indicated a construction of piers alternating with wide and narrow niches, proving a timber frame construction in the stonework similar to that of the inside. At the south end three piers were still standing, the faces of the stones decorated by scratched pictures. Many of the blocks fallen from the east wall and found overlying the storerooms between the two houses bore similar scratched pictures on their faces. In many cases later drawings had been superimposed on top of earlier ones; the decoration was thus informal, evidently scratched by idlers sitting on the bench and perhaps waiting for audience within. We dubbed these "doodle stones"; though crudely drawn they are valuable as representations of the contemporary eighth century scene. None were found that could be interpreted as writing. These drawings were not confined to the east face of the building. At the east end of the south wall, overlapped by the end of the north wall of the South Phrygian House (which is not now preserved as high as the earlier wall) one block was found, still in situ though cracked in two places, which bears the representation of two pairs of boxers (pl. 90, fig. 10). The face of the west wall, too, such as has been exposed, shows traces of scratched doodles. The building was thus demonstrably free-standing, and probably girdled on three sides by the bench set against its wall outside.

The doodle stones show all sorts of representations: of lions and dogs, goats and horses, many different kinds of birds, and plain geometric motives such as stars, lozenges, and latticed squares and triangles. A number show human figures; the most elaborate of these two warriors fighting (pl. 90, fig. 11). There were several representations of houses—small buildings with central doorways or windows, covered by gable roofs of which the timbers cross at the apex to form curving acroteria (pl. 90, fig. 12) like those of the Phrygian rock façades at Midas City.[7] These acroteria suggest that we were correct in our interpretation of a voluted poros piece found in 1955,[8] accompanied by two lion heads of poros. All of these, found reused in the rubble bedding of Persian Building G immediately above, must have come ultimately from the West Phrygian House. Both the gabled houses on the doodle stones and the acroterion, which demands a gable to crown, suggest a double-pitched roof for the Phrygian house.

Our house, then, clearly of Megaron type, of generous dimensions, richly paved throughout with pebble mosaic, and decorated outside with sculptured lion heads of poros, must have been more than a common dwelling. The bench around the outside suggests a waiting place for *clientes*. It must then have been a public building—perhaps the audience-chamber of a palace complex made up of several free-standing units within an enclosure. The Burned Phrygian Building may have been a part of the same complex; it too, as we have seen, was originally a free-standing unit, of a modified Megaron type. An enclosure-wall of crude brick starting at its northeast corner (plan, fig. 4) has been traced as far north as we have dug. This wall was a late addition, laid on top of the stone paving; but it was built before the destruction of the Phrygian town. It seems to have served to protect the area of the palace, if such it was, from intrusion by the vulgar entering the nearby city gate.

### SOUTH PHRYGIAN HOUSE

To the south of the Burned Phrygian Building lay a later house at a much higher level, but destroyed in the same holocaust that leveled the other two buildings. Only its northernmost edge has been uncovered, with the end of a cross-wall running southward. The north wall, of heavy masonry, was carried down below the level of the buildings at the north, blocking passage between them and overlapping the corner of the West Phrygian House. Behind this wall at the south fill was evidently thrown in until the desired floor level for the new house was reached—nearly two meters above that of the houses at the north. Future excavation beneath this floor may give some indication as to the dating of the various building periods of the Phrygian level.

The South Phrygian House yielded pottery in abundance. Along the west face of its cross-wall

[7] Compare Koerte, *Gordion*, 39f.

[8] *AJA* 60 (1956) pl. 93 and figs. 41-43.

vases had been stacked in quantity, all of the local polished ware. Of these some were black, some buff, a few red; occasional pieces, part black and part buff, had evidently changed color in the second firing to which they were subjected in the destruction of the house. Since the vases of similar fabric from the cemetery, which were subjected to no secondary firing, were all black, we are tempted to assume that the change in the color of the vases from the destruction level was from black to buff rather than the reverse. Close to the crosswall stood numerous large round-bodied jugs with trefoil mouth; the smaller vases packed in among them were for the most part round-mouthed jugs or small trefoil-mouthed jugs. Farther out from the cross-wall were five stacks of bowls. These had evidently been stacked, upside down, in round wicker baskets, for under each stack lay the central part of the floor of a basket, protected from the fire by the bowl resting on it (pl. 90, fig. 13). One of these stacks contained nearly forty bowls; the position of the fragments indicated a central stack, with bowls set on edge around it evidently to fill the space remaining in a round-bodied basket. The pottery was much the same as the plain wares found in the "kitchen" in 1955, and to be dated at about the same time.[9]

THE SMALLER MOUND

On the smaller habitation mound southeast of the city work was resumed in the burned Lydian building first investigated in 1952.[10] Here the problem for excavation has proved to be three-fold: not only the burned building itself and the tumulus with which it was covered after its destruction, but also, quite unexpectedly, the large terrace or bastion in which it stood, a massive construction solidly of crude brick embedded in an artificially accumulated filling of clay and approached from the south by a sloping ramp. The southwest corner of the bastion was cleared to bottom. It stands to a height of 10.70 m. (more than a hundred courses of brick) about 1.20 m. (twelve additional courses) missing at the top—a total of about 12 m. (pl. 89, fig. 14). The bastion seems to be solidly of brick; wherever the floors of the building it carried were probed, they proved to rest on a solid brick bed. The west side of the bastion has been traced northward for more than 20 m. from the corner; its width at its south end was 10.25 m. Approach was by a ramp 8.50 m. in width at the south; the ramp was bordered by retaining walls of crude brick. The face of the bastion was originally exposed to a height of between 5 and 6 m., with a slope or glacis of clay against its lower face.

The building carried on this modest substructure was of crude brick reinforced by timber framing. At present the building operation is assumed to have taken place around 600 B.C. The history of the building is not entirely clear, and more excavation will be undertaken to elucidate it in the next campaign. As observed in 1952 this building was the objective of violent enemy attack. Literally hundreds of arrowheads (predominantly two-flanged) were found in it, many of them buried to their full length in the faces of the walls. As by far the greater part of these was found on the east side of the building, it is tempting to see the hostile action as coming from the east. After the attack the eastern part of the building seems to have been abandoned and covered by a mottled clay filling. Perhaps in the course of this operation occurred the fire which destroyed the western part of the building; the eastern part, already covered by clay, was not affected by the fire. Thereafter the western part was also abandoned and filled with clay, presumably as a part of the building operation of the secondary tumulus which covered the apex of the mound. This can be dated by plentiful pottery at about the middle of the sixth century. In investigating the clay filling over the eastern area, clear traces were found of wheel ruts, undoubtedly left by carts bringing clay up the slope, together with wooden logs and scoops, reeds, ropes, and various implements of iron. The chief modification in the conclusions previously published about this building is that the battle and the fire were not in immediate sequence; there seems to have been an interval after the battle, during which clay was laid down (as a bulwark against renewed attack?) and before the fire which brought about the ultimate abandonment of the building and its covering by the tumulus.

THE CEMETERY

In the cemetery to the southeast and east of the biggest tumulus six lesser ones were investigated. One of these (T) beside the ancient road to the east

[9] *AJA* 60 (1956) 263f and pl. 94, figs. 46-47.

[10] *UPMB* 17, 4 (1953) 26f; *Archaeology* 6 (1953) 159f.

of the great tumulus yielded nothing. A second, U, at the foot of the ridge near Koerte Tumulus V, had evidently covered a cremation and yielded a few fragments of banded lydions and other sixth century pottery, but no proper cremation deposit was found. Three more burials to the east of Koerte Tumulus III (Q, R, S) were covered by mounds so eroded as to be barely visible at the surface. These mounds can never have been very big, and all of the graves, vulnerable because their scanty cover at the same time called attention to them and failed to protect them, had been robbed in ancient times. One had been a wooden chamber burial, the second a cremation, and the third apparently a plain cist dug in the earth. From these were recovered a few fibulae and other trinkets of bronze which had been overlooked by the grave-robbers.

TUMULUS P

The only major tumulus dug, P, lies to the southeast of the great tumulus, about equidistant from it and from Koerte Tumulus III which lies at the west. It rises to a height of about 12 m. above the present level. Drilling during the fall of 1955 had defined the position and limits of the stone-pile over the grave, an oval area about 14 and 17 m. in diameter. The exact position of the grave itself had been suggested in four drillings in which a hollow space had been detected above the stone, interpreted as space left void when the wooden roof of the tomb collapsed carrying the overlying stones down with it into the grave chamber. On this supposition, which proved to be correct, a trench 12 by 12 m. was laid out and dug over the hollow area and just to the southwest of the peak of the mound. At a depth of 2 m. below the surface the fill changed from earth to clay, and in the clay appeared a round hole about 5 cm. in diameter, which went right down to the roof of the grave. Shreds of wood found in the hole suggested that it had contained a wooden mast, put up over the tomb presumably to mark its position while the tumulus was being built; the rotting of the wood had left its mould in the hard clay around it. At the bottom, in fact, and resting on the center of the grave cover, we found the stump of the wooden mast which had fallen with the roof, still held in position by the stones around it. The mast seems actually to have been of two fairly short timbers placed one above the other. A similar mast-hole over the grave was noted in Koerte Tumulus III.[11]

The upper filling of Tumulus P, though of clay, was lumpy and granular, and not too difficult to dig. The lower four meters were a very hard mass of solid clay, completely devoid of sherds, which seemed to have been puddled and laid down damp. The stone pile covered by this was made up of fist-size stones with occasional larger ones. The hollow detected by the drill was duly encountered at a depth of about 10 m. The clay mass, once set, had been solid enough to stand up by itself in a sort of natural dome when the stone pile on which it rested settled into the grave on the collapse of its wooden roof. The total height of this pile over the grave cover must have been between 1.50 and 2 m.

The roof of the grave chamber proved to be double—a lower series of twelve cross-beams running north-south across the width of the chamber, and on top of them a second series of eleven beams laid lengthwise or east-west. The roof measured 6.40 m. in length by 5.50 m. in width. The largest of the beams, along the south side, was 6.40 m. long, .60 m. wide, and .35 m. thick. A single additional beam had been laid lengthwise on top of the cover, down the middle. Two beams at the south and two at the north, edge beams which did not span the hollow beneath, were found intact; a third along the north side, which did span the burial-chamber, was cracked near one end but had not given way. All of the cross-beams of the lower layer had broken near both ends and lay on the floor of the chamber, covered by the broken and downward-slanting beams of the upper series (pl. 90, fig. 15). The wood has been identified as black pine (*Pinus nigra*).

There was no way of knowing when the roof had given way—probably two thousand or more years ago. The result of the collapse and the resultant inrush of small stones had been a wild scattering of the objects placed in the tomb, some of which were badly broken and crushed when beams and stone had fallen on them, while others—along the edges—were protected by the slanting fragments of broken beams from the inrush of stone. The chamber itself, with inside dimensions of about 3.50 by 4.50 m., was built of large squared timbers fastened together at the corners by mortising. It had been built into a pit dug in the hardpan to

[11] Koerte, *Gordion*, 39f.

considerably greater dimensions, and the space around it filled with small stones. The pressure of these had cracked the timber walls on three of the four sides. Beneath lay more stone, covered by a floor of wooden planks which ran under the lowest beams of the walls (plan and section, pl. 91, fig. 16). The inside height of the chamber from floor to roof had been about 1.50 m.

All around the four sides at 25 cm. below the top of the walls was a series of small sockets cut in the wood, evenly spaced and each 25 mm. in length. These had held pegs which projected into the chamber below the level of its roof. One was found still in place, the snapped-off ends of others were still in their sockets, and a large number of pegs, about 15 cm. in length, were found fallen in the debris in the tomb. To the outer ends of some of these still adhered shreds of white cloth of a rather coarse open weave, like cheese-cloth. Evidently the walls of the chamber had been concealed by hangings of cloth. The other furnishings of the tomb (such as could be recognized) consisted of a large bed at the northwest corner and along the north wall, of which three legs were still in place against the walls, 1.10 and 2.30 m. apart; perhaps two chairs or thrones against the west wall, of which the smashed debris of one was found in the southwest corner, together with pieces of its footstool and an object perhaps to be interpreted as a canopy-holder; a table at the southeast corner and along the south side, recognizable from traces of its painted top, and perhaps a second table beside it at the west, against the south wall; a large bronze cauldron set on a tripod of iron near the center of the chamber, and another table with a mosaic top of inlaid wood beside the cauldron to the north. In addition to these there was a number of smaller pieces—a three-legged tray-table and a four-legged one, a second footstool, a wooden chest, and several wooden platters and bowls with bronze ring handles—all fragmentary and so tumbled about in the collapse that their original positions could not be certain. The hardened clay cover of the tumulus, once it had dried out, had evidently excluded all moisture, and to this we would seem to owe the preservation of the wooden furniture. Samples of the wood, submitted to the Forest Products Laboratory of the Department of Agriculture, were identified as boxwood (*Buxus sempervirens*), yew (*Taxus baccata*), pear (*Pyrus communis*), maple (*Acer sp.*), and poplar (*Populus sp.*), in addition to the black pine of which the tomb itself was made.[12]

The bronze cauldron at the center of the chamber, crushed down over its tripod-stand in the collapse of the roof (pl. 91, fig. 17), contained a large number of wooden objects. These included a spoon and fragments of several others, the bowl of a dipper, and several small saucers with open-work handles, two of which are visible in fig. 17 together with a carved group of a lion attacking a bull (also in pl. 91, fig. 18). Another figure, of a lion (pl. 91, fig. 19), preserves parts of the thin wooden plaque or base on which it stood, carved from the same piece of wood as the figure. The whole, only about 7 cm. high by 10 cm. long, is carved out of boxwood with the utmost delicacy of detail, from the rendering of the individual teeth to the fine engraving of the whiskers, the formal carving of the hair of the mane, and the delicate beading which outlines the shoulder. Another figure, of a winged horse eating (pl. 91, fig. 20) preserved even more of the base. The creature stands four-square on its feet, one wing backward in normal position, the other bent forward and used like a hand to steady the object that is being devoured.[13] Still another animal, an ox with a yoke on its neck (probably one of a pair yoked together; but only one was found) illustrates the extreme delicacy with which these tiny figures were made (pl. 92, fig. 21). The horns were made separately, perhaps of contrasting wood or of some other material, and attached; the eyes were inlaid, and a triangular blaze on the forehead was laid into a socket cut to receive it. Somewhat unnaturally in the case of this animal the socket for the horn lies in front of the yoke, while the ear is behind it! In addition to the animals illustrated the cauldron contained a number of others: a lion of a

[12] These were identified through the kindness of Dr. B. Francis Kuchachka of the laboratory in Madison, Wisconsin.

[13] This figure in many ways recalls the one found in Koerte Tumulus III and identified as a lion—in this case eating a recognizable smaller animal: Koerte, *Gordion*, 68, fig. 45 and pl. 5. The Tumulus III figure was taken to be the wooden handle from the lid of a large bronze cauldron similar to ours. Our cauldron, however, had no lid, and our animals must have been for the most part independent pieces. But two figures of vulture-like birds with dowels on their bottoms, found in our cauldron, must have been attachments on furniture or the like, as also an openwork wooden handle decorated with what appears to be frog's legs.

different type from the first, a running deer, and a horse decorated with grooved concentric circles, in style very reminiscent of the bronze figures inlaid with silver from the royal tombs of the Early Bronze Age at Alaca Hüyük.[14]

The body of the dead person had evidently been laid out on the bed at the northwest corner of the chamber, which served as a bier. No traces of a skeleton were found with the exception of the hollow enamels of five teeth, and these were found only in sifting of the debris from the tomb. They were identified by Professor Muzaffer Şenyürek at the University in Ankara as the teeth of a child four to five years old. That the body had been on the bed was indicated by the position of the personal adornments, all found in the area of the bed. Plate 92, fig. 22 shows a bronze belt as it was found, together with a large fibula, both of which must have been on the body, in the middle of the bed-area. The round-bodied dinos-like vessels, which had probably contained offerings of solid food (as opposed to a mass of amphoras and kraters at the east end of the grave, which had presumably contained liquids) must have been placed originally beneath the bed. A mass of fibrous purplish substance which overlay the whole area would seem to be the remains of a coverlet laid over the bed. Two rods of wood, visible in fig. 22, one within the belt and the other just to the right of it, seem to have been curtain rods. One of them is encircled by a strip of woven stuff like webbing, from which woven fabric had been suspended. These may have been the rods from which were hung some sort of bed-curtains. In the area of the bed were found several bronze fibulae and two more belts of bronze. All of the last were cracked and broken, but one could be fitted together for measurement. Its length was about 52 cm., a length appropriate for a child four years old as measurements of modern village children showed. To the inner face of one of the belts bits of the leather lining still adhered.[15] The belts were not hinged; the bronze of which they were made was evidently so thin as to be completely flexible. The outer faces of two were ornamented with extremely fine engraving, mostly in elaborate geometric motives of complicated meanders and the like (pl. 92, fig. 23). The fibula-like "handle" set at one end above the base of the hooked clasp finds parallels in work from the west coast and islands.[16]

On the floor of the chamber beside the bed lay a huge pile of astragals or sheep's knuckle-bones. Of these there were more than four hundred, some pierced by artificially drilled holes. They may have been used as playthings, but in general they seem to have had a value or significance which eludes us, since another large quantity was found in a coarse jug in one of the storerooms of the Burned Phrygian Building, and many others, evidently scattered from the broken vase which had contained them, lay on the mosaic floor of the West Phrygian House near the hearth.[17]

Most of the objects offered in the grave were found along the south wall. Some had been placed on the table with painted top; the tumbled position of those farther to the west suggested that they too had been set on a table and had crashed down when the roof gave way. The pottery chosen for the tomb was most appropriate for a small child, with a distinct emphasis on animal forms. In general it may be divided into three classes. Of the first, painted ware with decoration in matt black on a buff ground, the most amusing examples are a pair of goose-shaped vessels of which one is illustrated in pl. 93, fig. 24. These were made to be filled through an opening in the back, and to pour through the bill. Three round-mouthed jugs of the same fabric are decorated in geometric style, with animals—bulls, lions, deer and antelope—in panels (pl. 93, fig. 25). Two long-necked askoi are of the same fabric; a third (pl. 93, fig. 26, middle) is of a different sort—red decorated with matt black. The first fabric is almost certainly local; the second, though possibly also locally made, is much rarer at Gordion and may have been imported from another part of Phrygia. The most elaborate vessel of this

[14] See Hamit Zübeyr Koşay, *Les Fouilles d'Alaca Hüyük, Rapport préliminaire sur les travaux en 1937-1939*, pl. CXXX.

[15] Our identification of this substance as leather was confirmed by Eric Parkinson at the University Museum.

[16] From Chios and Ephesos: cf. *JHS* 76 (1956) Supplement, Archaeological Reports, p. 37, fig. 4 and p. 38.

[17] In later times astragals were used as gambling pieces. From the Hellenistic levels we have pieces inscribed on the proper side, NIKH and NI. From a seventh century environment there are two astragals of bronze. The modern village children still collect them in large numbers, and play a game (like marbles) with them. In remote parts of Turkey until very recently they had some small exchange value: storekeepers would give poor children a piece of candy for five astragals, then sell the astragals for cash to more well-to-do children. The astragals in the tomb may be explained as playthings; but those in the houses come from a more adult environment.

fabric is in the shape of a ram with curly horns, filled at the back and pouring from its mouth (pl. 94, fig. 27). A small lekythoid vessel of this class closely resembles Cypriote Iron Age lekythoi of the same shape, fabric and decoration; if not itself an import, it was certainly made under influence from Cyprus.

The third class of pottery found in the tomb, the local black-polished ware, was most generously represented. A jug in the form of a goat wearing an incised pearl necklace (pl. 94, fig. 28) is another example of the animal-form vessel, filled through a hole in the back and with a pouring hole through the mouth. A shallow bowl illustrates the skill and ingenuity of the potters (pl. 94, fig. 29). One inward-tilted handle with clay studs reflecting the influence of metalwork was used for tilting the bowl so that it would pour from the tubular spout nearly opposite; the central omphalos, connected by a tube with the spout, was pierced by double rows of small holes to serve for straining. The black polished fabric was represented in addition by a rhyton, a ring-vase, two jugs with trefoil mouth, and a number of sieve-spouted one-handled jugs of a common Phrygian type. The tomb contained altogether twenty-eight vessels of the three finer fabrics, as well as more than thirty large vases—dinoi, amphoras, and kraters—of somewhat coarser black polished technique and which must have contained offerings of solid and liquid food.

An equal number of bronze vessels—twenty-nine—had been placed in the tomb. Most of them were found along the south side of the chamber. Among these was a second cauldron, similar to the one at the middle of the room but smaller. There were also three deep round bowls with ring handles, two of which are illustrated in pl. 93, fig. 30. The third had been badly cracked by a falling roof beam, but still held in one of its upward-turned ring handles the end of a wooden stick which, thrust through both handles, had served as a carrier. Two dippers or ladles may have been used to fill these bowls, or to fill two small trefoil-mouthed jugs from them. A large shallow bowl has lifting-handles extending above the rim, riveted at the bottom to the walls. The rest of the bronze vessels were smaller shallow round bowls, mostly mesomphalic. Of these one is horizontally ribbed, most have several raised ridges around the central omphalos and plain walls (pl. 93, fig. 31), and one is elaborately decorated with raised designs of knobs and petals. This last (as well as the others) would seem to have been cast rather than beaten out by a repoussé technique.

Apart from the personal adornments and the vessels of bronze, the only object of that metal found in the tomb, near the southeast corner where it had evidently rested on the painted table, was a small quadriga—perhaps another toy. The chariot itself had been badly crushed by the fall of the tomb roof, and its reconstruction is problematical. The horses, only 47 mm. in height, show in the delicacy of the engraving of their manes and the inlaying of their eyes the same expertness in miniature work as do the carved wooden animals.

It seems probable that the bronzes, like the pottery and the wood-carving, were made at Gordion. Imported objects found in the tomb were three vessels of blue faïence, one of them a shallow bowl with lotos handles. Almost certainly imported was also a ribbed mesomphalic bowl of clear glass (pl. 94, fig. 32) which had been placed inside one of the bronzes. The vessels of faïence and glass must have come from the east—Syria, Palestine, or Mesopotamia; and the only influence certainly detectable in the other objects is also semi-oriental—the Iron Age of Cyprus. There was no trace of any import from Greece and the west.[18]

The tomb chamber had contained many objects of wood in addition to the collection of small animals and implements inside the bronze cauldron. Most of these were in very fragmentary condition, but in many cases enough was found so that restorations could be suggested with some assurance. There was a large number of small saucers and plates with varying decoration and form of handle. Most striking was a series of deep round wooden bowls made under the influence of metal work and trimmed with bronze. The fragmentary bowl (pl. 95, fig. 33) carved from pear wood, clearly reflects a metal prototype; the band around the outside of the rim in the bronze is separately made and fastened to the wall of the vessel by a series of vertical bolster-clamps hooked over the lip at the top and

[18] The earliest Greek import so far found at Gordion is an East Greek bird-bowl, dated around the middle of the seventh century: *UPMB* 17, 4 (1953) 33, fig. 26. The bronze belts from Chios and Ephesos would seem to be later than ours; perhaps in this case the influence was going in the other direction—from Phrygia down to the coast.

pinned by a small rivet at their lower ends.[19] In the bronze this device for strengthening the rim is ingenious and functional; in the wood it is literally copied, the rim-band and bolsters carved in relief, and it has no meaning. In the central space where the rim-band is lacking may have come a bronze ring handle like those of the bronze bowls (pl. 93, fig. 30), the ring held by a wooden socket. Three pairs of such ring handles, some with their wooden sockets still preserved, were found in the tomb; in one case the socket was decorated with round-headed bronze tacks.

The wooden furniture was most elaborate. The scheme of decoration of the mosaic-topped table may be restored on paper, but unfortunately a large part of it was covered by a fallen roof beam, and when the beam was lifted most of the inlay came up with it, adhering to its under surface. An elaborate construction of boxwood, found with the wooden throne in the southwest corner of the chamber, has been interpreted as a canopy-holder. To the carved wooden panel shown in pl. 95, fig. 34 was attached a curved wooden rod (pl. 95, fig. 35) of which the lower ends were doweled to the lower edge of the panel. The outer pair of dowel holes secured the ends of additional struts running to the base of the rod to steady it. A pair of dowels in the opposite side of the panel served to fasten it to another piece of furniture, or to the wall. The panel itself was carved from a single piece of wood now broken into four fragments so warped that they cannot be fitted together exactly. The upper end of the rod terminated in a wooden ring open at one side, perhaps to support the central part of a spreading canopy. Although these pieces were found with the fragments of the throne, the canopy holder (if such it is) cannot have been set up over the throne because the height of both together exceeds the height of the tomb chamber itself.

The wooden throne presents serious problems of reconstruction because its makers seem to have relied in large part on glue to fasten it together; such dowels as exist are too light to have borne any serious strain. The components found were legs (though it may be debated which of two sets found belong to the throne), two panels of openwork which bore the outer slats of the seat, the inner seat slats, and the back; evidently there were no arms. Of the two decorative panels found one (pl. 95, fig. 36) is much more elaborately decorated than the other. Not only are the carving and inlay more delicate and profuse, but there was also added ornamentation with round-headed bronze tacks, entirely lacking on the other panel. The corroded pins of the tacks may be seen still embedded in the wood in the illustration, and in places the outlines of the round heads are visible. On top of the panel lay the outermost of the series of slats which formed the seat, its position made certain by small dowel-holes which exactly match dowel-holes in the top of the panel. Only the outer slats were so fastened; the inner ones show no dowel-holes, and must have been fastened to the cross-pieces below by glue at their ends. The slats of the seat have rounded ends; as found they were overlaid by a mass of the same fibrous purplish stuff found over the bed area and interpreted as the remains of the coverlet; here doubtless the remains of the cushion which had covered the seat. The discrepancy between the two panels in their decoration leads us to assign them to the front and back of the throne (rather than to the two sides), and the form of the slats of the seat, with raised ends, confirms this since slats of this form would be more appropriately laid from side to side than from front to back. The panels must have screened from sight the upper parts of the legs of the throne, but there are no dowel-holes whatsoever for fastening them, either on the panels or on the legs; again glue must have been used. The width of the seat was 0.505 m.; its depth is uncertain, since it was made up of six slats and there is no evidence as to the width of the spacing between them.

The back of the throne (pl. 96, figs. 37-38, and frontispiece) was made of boxwood elaborately inlaid with yew. The upper part, of openwork, was made from many pieces fastened together with dowels and tongues: a wide central panel decorated with cut-outs, including a central "rose window," and to each side of it two narrower slats, all joined by spaced square blocks. The construction may best be seen in fig. 37, taken from the back before the whole could be turned over. In this may be seen not only the individual square panels which joined the vertical strips, but also the ends of the little round wooden pegs driven in from the back which

[19] Compare the Phrygian bronze bowls from the tumulus at the Agricultural School, Ankara: E. Akurgal, *Phrygische Kunst*, pls. 57-59.

held in place in their sockets the tongues of these blocks, pierced to receive the pegs. The lower part of the throne-back was decorated with three rows of five decorative panels, each row a separate piece of wood and all fastened together with dowels. This part of the throne-back was in much more fragmentary condition than the upper section, but the restoration in the frontispiece is substantially correct. Although itself made up of many pieces painstakingly fastened together with dowels, tongues, and pegs, the throne-back as a whole shows only two very light dowels at the ends of its top by which it might be fastened to anything else. These top-dowels are far too light to have borne any strain; they probably carried terminal finials. The back of the throne, then, was independent of the seat, which must have been a movable stool. The back must have been fastened permanently against the wall, and the only convenient way for so fastening it appears to be by the pair of small square holes at the center near the top, which has no relation to the general decorative scheme. Pegs in the face of the wall and fitted exactly to those holes would have held the throne-back firmly suspended against the wall; their ends may have been appropriately decorated.

These considerations raise the question as to whether the throne was a piece of furniture made for actual use and perhaps placed in the tomb as an offering taken from the palace, or whether it was a kind of symbolical piece of furniture made specially for the tomb and not as strongly joined as would have been necessary had it been intended for use in daily life. In a piece intended for actual use we should have expected the seat-slats and the panels concealing the legs to be fastened by something more substantial than glue. Yet the time-factor must also be taken into consideration: a piece of furniture as elaborately inlaid could hardly have been made in less than several weeks, and if the throne was specially made as a piece of tomb-furniture it follows either that the death of the child was anticipated, or that its burial was held up for some time after death.

The inlay may be seen in the photograph, pl. 96, fig. 38, and in the restored drawing, the frontispiece. It is of yew inlaid into boxwood, giving a striking color contrast of dark and light. The channels for inlay were made by drilling straight rows of holes and then cutting away the wood remaining between the drill-holes with a sharp knife. The bottoms of the channels, which vary from 5 to 7 mm. in depth, show the round ends of the holes made by the drill. The patterns of the inlay are all geometric, in some ways calling to mind the decoration of the Phrygian rock-façades at Midas City,[20] where many of the same or similar motives are used. From our throne we may perhaps form an idea of the one offered at Delphi by King Midas, which Herodotos reports to have been "worth seeing"—the earliest offering made by a foreign potentate to Apollo at Delphi.[21] Dedications of wood and other perishable material are hardly to be expected to survive. The wooden objects from the Gordion tomb are almost unique outside Egypt, and open to us a whole new field to illustrate the achievement of early craftsmen in materials hitherto known to us only through written accounts.[22] The throne from the tomb must have been made during the reign of the King Midas who was on the throne of Phrygia during the late eighth century, and who was overwhelmed by the Kimmerians early in the seventh—perhaps the same Midas who dedicated the throne at Delphi.

The richness of our tomb suggests that it contained the burial of a child of rank—perhaps a member of the reigning family. Among the black-polished pottery contained in it were several vessels of types very similar to examples found in the houses on the city mound, which seem to have been destroyed early in the seventh century. It is inconceivable that a tomb of such wealth could have been made very soon after what looks like a general catastrophe; rather, the burial must have been made somewhat before the Kimmerian incursion. It is to be dated, therefore, with strong probability in the years around the turn from the eighth to the seventh century,[23] and in the still prosperous part of the reign of the famous King

[20] Particularly in the so-called Midas grave: H. T. Bossert, *Altanatolien*, 1028, pl. 267.

[21] Herodotos 1. 14. 3. It has generally been assumed that it was offered by the famous Midas of the eighth and early seventh century, during whose reign our tomb must have been made. But elsewhere in Herodotos we gather that a line of Midases continued to rule in Phrygia after the Kimmerian invasion. The next foreign potentate after Midas to make offerings at Delphi was, according to Herodotos, Gyges of Lydia.

[22] The wooden dedications from the Heraion at Samos, *AM* 68 (1953) 77*f*, would seem to be slightly later than the Gordion ones.

[23] There are many parallels between objects from Tumulus P and Koerte Tumulus III, usually dated about 700 B.C.

Midas. Its contents, together with the Phrygian houses in the city, abundantly illustrate the astonishingly high level of material culture achieved by the Phrygians up to the time of their downfall. The problem as to whence they came and when they entered Anatolia must await deeper excavation. We have long known that their language was a branch of the Indo-European family. Their art in the eighth century, largely geometric, and their architecture with its characteristic Megaron type of building, suggest that they brought with them a northern or western tradition when they entered Anatolia and that they clung to this tradition in their new oriental environment. There is little or no evidence of intercourse with Greece at this early time, or of influence from one direction or the other; rather, the Phrygians and the Greeks would seem to have had a common tradition which was developed independently on the high interior plateau of Anatolia and in the coastal lands of Greece and the Aegean, the former to be cut off at an early stage by barbarian invasion and never to recover.

THE UNIVERSITY MUSEUM
PHILADELPHIA

# Oriental Elements in the Hallstatt Culture

CLARK HOPKINS

PLATES 97-100

In the first half of the first millennium B.C., the Full Bronze Age of Central Europe reached its highest development. In the last stage of the Bronze Age period, that immediately preceding the Iron Age, objects of hammered and welded bronze were commonly used in addition to the molded bronze ornaments, implements and arms of the earlier Bronze Age. To this period of hammered and welded (or brazed) bronze objects, Childe has given the term "Final Bronze Age" (V. Gordon Childe, "The Final Bronze Age in the Near East and in Temperate Europe," *Proceedings of the Prehistoric Society for 1948*, 14, pp. 177ff). Within this final phase a group of bronze vessels and designs especially connected with finds at the famous Hallstatt site, twenty miles southeast of modern Salzburg, may be designated for convenience (though perhaps a little cumbrously) as examples of the Hallstatt Culture in its narrowest sense.[1]

The Final Bronze Age was by no means the first period of Central Europe in which bronzes had been imported from the Orient. Schaeffer has traced the very extensive trade from Phoenicia to Central Europe in molded bronze implements and ornaments during the Early Bronze period (Cl. F. A. Schaeffer, "Les Porteurs de Torques," *Ugaritica* 2 [1949] 49ff) and Hencken has shown the relationship between the helmet of hammered bronze found at Beitzsch and the Minoan types.[2] The Amber Route, running from the head of the Adriatic to the North Sea and the Baltic became increasingly popular in the Mycenaean period as the large amounts of amber in the Mycenaean tombs attest and there is no reason why welded and hammered bronze objects should not have been imported into Central and Northern Europe in exchange for amber at this time.

Childe has demonstrated brilliantly that in the very beginning of the Final Bronze Age, a period which embraces part of both the Urn Fields, and the Wagon graves, cups of hammered bronze were widely distributed over Central Europe. The drinking cup of bronze, both plain and embossed (the Friedrichsruhe and the Jenšovice) were imported or manufactured, or both, in an area stretching from the Adriatic and Italy to the Baltic and from Germany to the lower Danube (See Childe's distribution map, *PPS for 1948*, 190, fig. 8). A recent find in Bavaria of a Wagon grave (pl. 97, fig. 1) shows the chief types of hammered bronze vessels in Central Europe before the Hallstatt phase: that is the cup of rounded tea cup form with ribbon handle, the embossed decoration, and the pail with handle reaching from the shoulder of the vessel to the lip.

More particularly associated with Hallstatt in the Final Bronze Age period, as well as with Oriental prototypes, are the cauldron or deep bowl commonly equipped with one or two free-swinging handles and the pail either with horizontal, hydria-type handles, or the free-swinging handles. The clamp for the free-swinging handle is the tee or double tee. Ornamental designs are largely confined to the water bird, or the bird protome with circle disk. The bossing of vessels is sometimes employed as border pattern for the more elaborate figure designs or to emphasize or outline the designs themselves. These special types of bronzes and their relationship to the Orient constitute the subject of our study.

An example of a cauldron with a wide fairly deep bowl, equipped with two free-swinging handles, supported by the tee or double tee clamp riveted to the sides of the vessel, is pictured in pl. 97, fig. 2 and comes from Grave 600 in Hallstatt. Åberg allocates it to the so-called Older Hallstatt period. It differs from later examples by the clamp made in two pieces and a vertical bar of excep-

[1] Unfortunately, the terms Hallstatt I and II are now relegated entirely to the Iron Age, and the earlier Hallstatt periods (A and B) are allocated to the broad Bronze Age epochs E and F in Central Europe. The whole complicated terminology of Central European Chronology has been redefined by C. F. C. Hawkes, "From Bronze Age to Iron Age: Middle Europe, Italy, the North and West," in PPS 14, pp. 214-15.

[2] *PPS for 1952, Pt. I*, pl. II. The clay cup of Vaphio shape from Bohemia presupposes Cretan metal cups in Central Europe. *Reallex. der Vorgesch. I*, pl. 49.

tional length.[3] (Nils Åberg, *Bronzezeitliche und Früheisenzeitliche Chronologie*, Kungl. Vitterhets Historie och Antivitets Akademien *II-III*, fig. 23, p. 22, Stockholm 1931).

The pail (pl. 97, fig. 3) has horizontal handles riveted to the shoulder through horizontal extensions of the handle ends. The most common and striking type of decoration is a combination of circle or disk and long-necked water-bird protome. Sometimes the heads are linked with a band which circles the disk, as in the urn from Denmark (Åberg, *op.cit.* V, p. 91, Abb. 167) as if the band or the disk or both represented the body of the bird (pl. 97, fig. 4). Sometimes disks or circles separate the protome figures rising from a horizontal line along the shoulder (fig. 3). Almost invariably the heads, the disks and the horizontal bands along the shoulder are accented with the studs or rivet head projections.

In Central Europe the term *Hallstatt Duck* is occasionally applied to this disk and duck or protome bird design because it is so characteristic a feature in the bronzes of the Hallstatt period. Since it is so distinctive a motif it is easiest to trace and since its origins most obviously go back to the eastern Mediterranean it may be taken as the prime example of Oriental Hallstatt motifs.

Both Åberg (Åberg, *op.cit.* V, Abb. 216) and Miss Roes (A. Roes, *Greek Geometric Art*, Oxford 1933, fig. 6, p. 16) derive the Central European disk-duck design from Italy and ultimately from the Orient, through the development of the double duck design in Italian bronze belts. The belt from Populonia (pl. 97, fig. 5) with its combination of single and double bird, as well as the characteristic S-curves attached to the disks, forms a most striking example. (O. Montelius, *La civilization primitive en Italie*, II, Italie centrale, Planche 2, Stockholm 1904, pl. 281, 2). On the other hand neither Åberg nor Miss Roes account sufficiently for the importance of the circle or disk in the design. In general, as the birds, especially the double bird, as shown in figure 5, becomes more stylized, the body becomes more and more narrow. The introduction of the circle is surprising, therefore, and still more the use of the circle as stylized body without any other connecting links between heads. I have suggested elsewhere, therefore (*Berytus* 11 [1955] 75ff), that the disk-duck design originated in the serpent-disk, the Uraeus, of Egypt and was adapted in Italy (where the serpent-disk of the sun was misunderstood) to the ducks and disks and the duck-disk of the Etruscan belts.

Professor Van Tyne, professor of zoology at the University of Michigan, has very kindly pointed out to me that the "duck" on the belt from Populonia (fig. 5) has the heavy body, the comparatively short legs, the curved neck and particularly the excessively long and remarkably upturned bill of the pelican. The stylized form on the belt accentuates still further the long and sweeping bill. Identification of the bird with the pelican seems certain on some of the other belts from Italy, as for example, the belt from an inhumation grave of Corneto, since the heads of the birds are crested (pl. 98, fig. 6) and the pelican alone of the short-legged water birds boasts a tuft or crest on top of the head (Montelius, *op.cit.* II, 2 pl. 285, 4a). The same crests appear on the handles and crowning ornament of the striking bronze pyxis (pl. 98, fig. 7) from Benacci II (Montelius, *op.cit.* I, 1 pl. 81, 6b). On a clay fruitstand (pl. 98, fig. 8) from Veii (Montelius, *op.cit.* II, 2 pl. 350, 12) the painted birds are without crests but have bills so large they could belong to no other bird but the pelican. On the bronze pitcher belonging to the Older Hallstatt period (pl. 98, fig. 9) from Grave 500 in Hallstatt, the crests are still preserved on the heads of the pelicans though the birds themselves look more like ducks (Åberg, *op.cit.* II-III, p. 16, fig. 12).[4]

Most interesting on the belt from Populonia are the rayed patterns attached to the disks between the S-shaped heads of the birds, since they represent the stylized tails of oriental sun-disks. It is worth noting that the bird's tail is never represented in the winged disks of the sun and the Uraeus of Egypt, but becomes a prominent feature of the winged sun-disks in countries north of Egypt, both in Mesopotamia and in Anatolia.[5] (W. H. Ward, *The Seal Cylinders of Western Asia*, Washington, D.C. 1910, pp. 306-07.) Striking on the belt from Populonia is the fact that in Etruria the winged disk and serpents' heads have become under Etruscan adaptation and transmogrification, a circle,

[3] The double tee clamp made of one piece is illustrated in one of the cauldrons from Hungary (fig. 2), Joseph Hampel, "Trouvailles de l'age de Bronze en Hongrie," *Compte-Rendu de la Huitième Congrès Intern. d'Anthropologie à Budapest*, II, 1876, 2nd Part, pl. LXV.

[4] For the special significance of the pelican in legends and tomb-cults of Egypt, see the article of E. Otto in *Studies Presented to David M. Robinson*, I (1951) 215ff.

[5] I have discussed these relationships more fully in my article in *Berytus* 11.

a stylized tail and two most elaborately stylized heads of pelicans. In the belt from Corneto (pl. 98, fig. 6) the protome crested heads are associated with disks rather than attached to them. It is perhaps equally worth noting that in spite of the popularity of the serpent-disk, the *Uraeus*, in Egypt, and the winged and tailed sun-disk in Asia and Anatolia, it is never to my knowledge used in the Greek designs of any period. If it appears at all on the west coast of Greece and the central Adriatic shores, it is most uncommon. From the Orient it came to Etruria, and was popularized on the belts (figs. 5 and 6), the helmets (pl. 99, fig. 18) and the bronze urns (e.g. Montelius, *op.cit.* II, 2, pl. 281, 26). The subject is discussed further in *Berytus* 11 (1955) 75-84. Its passage is easily traced through Bologna in the Benacci I period (D. Randall-MacIver, *Villanovans and Early Etruscans*, Oxford 1924, pl. 4) and Este. The belt from Este (pl. 98, fig. 10) presents the pelican without legs and just the suggestion of a crest (Montelius, *op.cit.* I, 1, pl. 52, 1) and beside it the tailed sun-disks with quadruple pelican heads or (next to the bird) the heads on each side of the stylized tail, with the tails of serpents still persisting on the opposite side of the disk. Randall-MacIver (*The Iron Age in Italy*, Oxford 1927, pp. 14-15) allocates the belt to the second stage of the second period at Este.

The cauldron may have been introduced into Europe by way of the Adriatic for the Tiryns hoard, with its tripod and cauldron (with two rounded handles rising above the bowl and riveted to the rim with vertical extensions of the handles), belongs to the end of the Mycenaean period (Karo in *AthMitt* 55 [1930] 132, fig. 4). A whole series of cauldrons, largely with legs attached, of the Geometric and Orientalizing periods, were found in Ithaca and Olympia.[6] The cauldrons have handles in the form of large bronze rings, upright and welded to the rims. Not infrequently small figures of animals and men adorn and crown the rings (pl. 98, figs. 11 and 12).

To support the rings through which ropes or sticks would be inserted for lifting, a horizontal bronze plate was riveted to the rim (fig. 11). The small vertical strap handle of bronze was sometimes attached to the horizontal plate (fig. 11), sometimes ran through the ring with a small loop and was attached inside the rim of the cauldron (fig. 12). This forms an anchor for the upright ring, an inchoate tee clamp made of two separate strips of bronze (*BSA* 35 [1934-35] pl. 18, fig. 6 from Olympia).

A logical development from such a clamp would be the fastening of the covered pail from Benacci II (pl. 99, fig. 13) with its long vertical clamps made separately from the vertical cross bars. The type is strikingly similar to the long two-piece tee clamps on the cauldron from the Older Hallstatt period illustrated in figure 2. The great difference from the fastenings of West Greece cauldrons is that the Italian and Central European clamps support the narrow rings for free swinging handles, as opposed to the vertical rings designed for horizontal stick or staff handles of the Greek.

The striking cauldrons of Etruria adorned with protome heads of animals and griffons appear as early as the seventh century in the tombs of Regolini-Golassi at Tarquinia and Barberini at Praeneste (G. Q. Giglioli, *L'Arte Etrusca*, Milan 1935, pls. XIII, right and XI respectively). At least at this time the cauldrons are in general made independently of the tripod.[7] The older and simpler forms of cauldrons, both those made separately from the tripod and those with tripod legs riveted to the sides, have no handles for lifting.[8]

Certainly one of the oldest, if not the oldest, Etruscan attachments for lifting cauldrons comes from the Circle of the Cauldrons in Vetulonia. The bowls are adorned with the protome heads of lions and griffons and the attachments are in the form of winged busts (head, arms, shoulders) supporting the bronze lifting rings.

The busts on one of the cauldrons (that of the griffons protome, pl. 99, fig. 14), represent bearded Janus heads (Giglioli, *op.cit.* pl. VI, 1) of Assyrian type;[9] on the second cauldron (that of the lions) the busts represent winged sirens (D. Randall-MacIver, *Villanovans and Early Etruscans*, Oxford 1924, fig. 44, p. 132). In all cases a rivet is set in

[6] See Miss S. Benton's excellent discussion, "The Evolution of the Tripod-Lebes" in *BSA* 35 (1934-35) 74ff.

[7] Some of the Etruscan cauldrons have legs attached, for example, Montelius, *op.cit.* II, 2 pl. 307, 21, from the Montarano tomb of Falerii; pl. 313, 23 from Narce; and *AJA* 39 (1935) fig. 4, opposite p. 200, from Chiusi.

[8] One early form of tripod with sharply bent leg is sometimes attached to the bowl, Montelius, *op.cit.* II, 1, pl. 178, nos. 11, 21, and 23 from Vetulonia; pl. 181, 14, from Circle of Bes. Sometimes the tripod is made separately, Montelius, *op.cit.* II, 2 pl. 291, 15a and b, from an inhumation grave at Corneto; Montelius, *op.cit.* II, pl. 183, 19, from Val di Campo.

[9] K. R. Maxwell Hyslop (*Iraq* 18, Pt. 2 [1956] 151) suggests the figure is executed in Urartian rather than Assyrian style.

each wing and in the tail so that the clamp is in the general form of a tee made in a single piece. A small vertical loop of bronze projecting from the center of the clamp supports a lifting ring. From the illustration (fig. 14) it is clear that the means of lifting would be a rope rising high above the cauldron, since the head would block any passage of a straight stick when the ring was upright.

The use of winged clamps in the East is well attested by the representation (pl. 99, fig. 15) on the relief from Khorsabad (Layard, *Nineveh* II, 1850, p. 305). At Hama, in Syria, Ingholt found a clamp in the form of a winged figure among the debris of the pre-720 B.C. era (H. Ingholt, *Rapport préliminaire sur sept campaignes de fouilles à Hama en Syrie*, 1932-1938, Copenhagen 1940, p. 113. Det. Kgl. danske videnskabernes selskäb. Archaeologisk-kunsthistoriske meddelelser III, 1). The winged forms may be compared with the riveted theriomorphic clamps from Nimrod (A. H. Layard, *Discoveries among the Ruins of Nineveh and Babylon*, Second Expedition, 1853, p. 185), which support horizontal hydria-type handles. A winged clamp with double human heads from Van is published by Maxwell Hyslop (*Iraq* 18, Pt. 2 [1956] pl. XXVI, 1-2).

Along the west coast of Greece, from Olympia, comes a clamp (pl. 99, fig. 16) in the shape of outstretched wings and tail from which rises a bull's head (*BSA* 35 [1934-35], pl. 20, 6). More common at Olympia are the sirens with outstretched wings and rounded body rather than tail (E. Curtius and F. Adler, *Olympia IV*, pl. XLIV). A different type is represented by the plain small little clamp with small ring for free-swinging handle. It is oval with a slight tee-shape form and fixed with three rivets (*Olympia, Text IV*, figs. 871, 872, 873, p. 140). A complete jar (*op.cit.* fig. 868, p. 139), shows a horseshoe shaped handle attached to an oval clamp fastened by two rivets.[10]

Before the free-swinging handle is pursued further, however, one should note an extremely interesting feature belonging to the polyheaded cauldrons of Etruria. The cauldron bowls represent the stylized bodies of animals from which the protome heads of the polyheaded creatures project. Sometimes in Etruria there are four heads, e.g., the cauldron from the Barberini tomb (cited above, Giglioli, *op.cit. Taf.* XI), more often six, as on the cauldrons from the Circle of the Cauldrons. The griffon is the most popular form of animal, though sometimes the heads are those of lions (the siren-clamp cauldron from Vetulonia), sometimes of serpents (the silver bowl from the Bernardini tomb, Giglioli, *op.cit.* pl. XXXIII, 1), sometimes both lions and griffons (the cauldron from the Barberini tomb). In the bronze "Phoenician bowl" (pl. 99, fig. 17) of the seventh century (F. Poulsen, *Der Orient und die Frühgriechische Kunst*, Berlin 1912, fig. 86, p. 89, dated on p. 91) the stylization is carried one step further and the heads rise from the circle with central circle-rosette which represents the body of the animal. In Central Europe, pl. 97, fig. 3, the head of the pelican detached from the circle, rises from the horizontal band around the shoulder of the pail. The same stylization is found on the helmets of Etruria (pl. 99, fig. 18) on which stylized protome heads of pelicans rise from horizontal bands around the rims.[11] In the helmets of Etruria and the pails of Central Europe the circles which accompany the heads make it certain, it seems to me, that the designs belong to the Etruscan disk-duck motifs. Alternate circles and ducks or pelicans form one of the zones in each of two bronze shields found in Tomb 1036 at Veii (*AJA* 61 [1957], pl. 3, fig. 8 and page 3) dated by Hencken in the first half of the seventh century. The concentric circles and the protome heads are a variant or successor of the circle and complete bird design. It may be said, therefore, that the extensive use of protome heads is a special Etruscan preference, first exhibited on the belts, then on cauldrons and helmets.

In the Orient the free-swinging handle above the orifice is common for smaller vessels. The bucket from Khorsabad, pl. 99, fig. 15, may have been made of plaited leather or wicker, or it may have imitated in bronze or stone the cheaper material. Certainly the ceremonial vessels carried in the hands of Assyrian winged figures (e.g., E. A. Wallis Budge, *Assyrian Sculpture in the British Museum*, pl. XXX, reign of Ashur-Nasir-Pal, 885-860 B.C.) were of valuable and durable material. The Hittites used a vessel of similar size though with rounded bottom (E. Pottier, "L'Art Hittite," *Syria* 2, fig. 96, and *B. M. Carchemish* II, pl. 21, upper register) and handles

[10] Recent finds made by Rodney Young in Gordion *ILN*, Nov. 10, 1956, fig. 14, and dated circa 700 B.C., show bronze bowls with clamps supporting small handle rings but without bronze handles.

[11] e.g., Montelius, *op.cit.* II, 2, pl. 281, 1, as an example of the bowl-shaped "face" helmet, and II, 2, pl. 276, 11, as an example of the crested pointed type of helmet.

just comfortably large enough for one hand. When handles for wider bronze bowls were required, two or more vertical upright handles (hand size) were riveted to the rim (Layard, *Second Expedition*, 185) or free-swinging bronze handles of hand size were placed on either side of the orifice, not spanning the top (Layard, *op.cit.* 184 and 185).

In Egypt there are many different forms of situlas with free-swinging handles over the top.[12] In general they are fairly small narrow-mouthed vessels with rounded or pointed bottoms (*JNES* [1947] pl. IV). An example (pl. 99, fig. 19) from the Chicago collection of the Saite period will serve as a model (*JNES* [1947] pl. VI c). The bronze handle, scarcely large enough for the hand, is looped through a small ring rising from the rim of the vessel. The pointed bottom is fashioned into the leaf or lotus petal ornament as if the pail were resting in the flower, and two zones of figures decorate its side.

In Europe the special preference for the free-swinging handle in Etruria may be compared with the paucity of examples in early Greece. A single example from the Mycenaean period is a small pedestalled cup or bowl from the fourth shaft grave (G. H. Karo, *Die Schachtgräber von Mykenai*, Munich 1930-33, pl. CXXXV, 909a). In Etruria the handle is employed in pilgrim bottles (pl. 100, fig. 20), on pails (pl. 100, fig. 21), and on vertically collared vessels (pl. 100, fig. 22). The pilgrim bottle comes from the Corneto tomb of the Eighth of March, 1883 (Montelius, *op.cit.* II, 2, pl. 282, 13a), and is particularly pertinent to our discussion for the pilgrim bottle is of oriental origin and it brings with it into Etruria the free-swinging handle. The handle is of early type, that is an appropriate size for the hand. The bronze vessels from the Faliscan tomb of Montarano (fig. 22) have the well-known Aegean-Egyptian forms with upright collars (Montelius, *op.cit.* II, 2, pl. 307, 16, and 18). The form of the vessel with bail handles recalls the Egyptian type with free-swinging handle found at Saqqara (*JNES* [1947] 171 and pl. IV, 5) though the Etruscan example has sharper shoulders and a lower collar. The gradual widening of the neck of the vessel with a consequent extension of the handle may be traced in Etruria through the illustrations of Montelius (*op.cit.* II, 2, pl. 255, 13 and 256, 6 from Bizenio).

The twin handles of the Montarano vessel are anchored with double loops of bronze in the form of a capital cursive emm. Such a support, but with a decorative element in the center and very probably of a slightly later rather than an earlier period, comes from the Bocchoris tomb of circa 700 B.C. (Montelius, *op.cit.* II, 2, pl. 295). A clamp of similar form and central decoration comes from the Correcchio Circle at Vetulonia (Montelius, *op.cit.* II, 1, pl. 179, 7).

An excellent example of the oriental pail shape, the situla, with flat bottom, slanting sides and wide orifice, appears in Etruria in the Bocchoris tomb (pl. 100, fig. 23). It is the vessel signed with the cartouche of the king which gives its name to the tomb. (Dates for the Bocchoris reign are usually given as 734-728 B.C. Mrs. Dohan suggests 718-714, *AJA* 39 [1935] 205). The pail does not have a handle. In decoration it bears a striking resemblance to the Saitic situla, for the lotus petals adorn its base, there are two zones of decoration in each case, and the monkey in one zone, and the ankh symbol carried in another, suggests a common origin. The ankh sign in Egypt is, of course, most popular and the monkey a familiar feature in the adoration of the sun-boat, but the parallel combinations in Egypt and Etruria make the connection particularly strong. Pails from the two circles of Pelliccie (pl. 100, fig. 21) have free-swinging handles anchored in one case to little loops rising from the rim, in the other to narrow clamps, riveted horizontally (Montelius, *op.cit.* II, 2, pls. 195, 28 and 196, 26).

The complete tee clamp supporting a small ring to hold a free-swinging handle seems to be the result of a combination of elements in Italy. Probably one of the earliest forms is the tee made in two pieces of bronze with the long vertical bar, exhibited in figures 13 and 2 from Benacci II and Hallstatt. The two-piece tee comes up the Adriatic. The ring designed for a higher handle of rope appears first in the Vetulonia tombs (pl. 99, fig. 14) and the small ring for bronze handle comes both to Greece and Etruria from the East. The tee clamp, or double tee clamp in a single piece, might be a natural evolution or might rather be affected by the winged and tailed figures of Etruscan tee clamp shape. It is obvious that as the free swinging handle was employed to lift bigger and bigger vessels, a heavier and heavier clamp was needed for the handles. The tee clamp could have been perfected in Italy or in Central Europe or in the Orient, but it seems unlikely that the combination with the

[12] See the excellent account by Miriam Lichtheim in *Journal of Near Eastern Studies*, 6 (1947) 169ff.

bronze free-swinging handle could have been made before 700 B.C. and it might reasonably be considerably later.

Bossing or studding in Mycenaean Greece was common on plaques and bands of gold (H. Schliemann, *Mycenae*, New York, figs. 281, 291, 293, 337, 481, etc.) and is used occasionally on a goblet (e.g. Schliemann, *op.cit.* fig. 344). Childe has suggested that the embossed cup of the Final Bronze Age in Central Europe was derived from the embossed gold Mycenaean type (*PPS for 1948*, p. 189). A difficulty perhaps is that bossing of bronze in the Mycenaean period is rare indeed, though occasionally, as on the cauldrons of the Tiryns hoard, there are a few raised knobs which suggest ornament (G. H. Karo in *AthMitt* 55 [1930] pl. xxxv).

In Etruria bossing seems peculiarly at home for it occurs on so many types of early bronzes, belts, shields, bottles, vases, etc. That the technique is derived in part from the East seems clear from its employment in vessels of obviously oriental form. The pilgrim bottle with its decoration of concentric circles and studs furnishes a good example (pl. 100, fig. 20). The two-collared vessels from Montarano (pl. 100, fig. 22) with their Aegean shapes and Egyptian connections furnish further proof. In the Warrior Tomb (circa 725 B.C.) were found both an embossed pilgrim bottle, and a round shield (pl. 100, fig. 24) decorated with bossing and concentric circles. Contemporary use of bossing in the Orient is exemplified by the embossed breaststrap in the relief from Nineveh (pl. 100, fig. 25, Layard, *Second Expedition*, 178).

In its first phase both in Etruria and Central Europe it is used simply in decorative rows as it was in the breaststrap from Nineveh. A second phase of its development is exemplified by the use of bossing as border pattern for more distinctive designs: the concentric circles in the case of Etruscan pilgrim bottles and bronze shields (e.g., pl. 100, figs. 20 and 24).[13]

The special Etruscan contribution to this Eastern technique was to outline or accentuate the designs themselves with bossing. This appears on the bronze urns (e.g., Montelius, *op.cit.* II, 2, pl. 281, 26) and on the helmets (e.g. pl. 99, fig. 18) of southern Etruria, and was adapted to the belts of Benacci I (Randall-MacIver, *Villanovans and Early Etruscans*, pl. 4). It is an extension of the border patterns to the designs themselves in imitation of the granulated gold work which appears in Etruscan tombs first as border patterns in the Warrior and Bocchoris tombs, then accentuating geometric designs in the Regolini-Golassi tomb and finally outlining and emphasizing the figure designs themselves in the Barberini tomb.[14] This technique of accentuating designs by bossing them becomes an outstanding feature of the Hallstatt bronzes (pl. 97, figs. 2 and 3).

Included with the collared bronze vessel with free-swinging handles from the Montarano tomb is a second vessel from the same tomb (pl. 100, fig. 22) with horizontal handles riveted to the shoulder by horizontal extensions of the handles. The vessel is even more Aegean in type than its sister, for its collar is higher. It compares favorably, in fact, with the high collar of the Egyptian vessel from Saqqara. The indented horizontal bar of the handle is reminiscent of some types from Nimrud (Layard, *Second Expedition*, 185).

The hydria type of horizontal handle along the shoulder is, of course, widespread in Greece and the Orient. It fails, therefore, to make as distinctive an oriental feature in Etruria and Central Europe as other elements. It is a feature, however, of the pail from Hungary (pl. 97, fig. 3) and belongs to a large number of European vessels. Perhaps it is sufficient here to point out the similarities between the Etruscan and Hungarian types in the illustrations. The sizes and shapes of handles are the same, positions on the shoulder of vessels are similar, and the same horizontal fastenings, consisting of horizontal extensions of the handle turned at right angles to the vertical side bars, are riveted to the sides.

Striking in the Final Bronze Age of Central Europe are the two distinct stages of development. The first is characterized in shapes by the bronze drinking cups, and the pail with vertical handle, in designs by the bossing in simple rows. In the second stage the cauldrons and pails have free-swinging or hydria handles, are adorned with the

[13] Some of the shields from Crete (F. Poulsen, *Der Orient und die Frühgriechische Kunst*, Berlin 1912, figs. 76 and 78) attributed by Poulsen to the ninth century have embossed borders separating much more elaborate designs. This same decorative arrangement appears on the Etruscan shield of Perugia on which the zones of horses are separated by rows of bosses (Montelius II, 2 pl. 251, 9) and on the pyxis from Benacca II (fig. 7).

[14] e.g., Giglioli, *L'Arte Etrusca*, pls. XIX, 4 (Warrior); Randall-MacIver, *Villanovans*, pl. 31 (Bocchoris), Giglioli, pl. XXVIII, 1 (Regolini-Golassi in geometric border patterns), Giglioli, XXIV, 1 (Barberini in chimaeras and winged lions).

Hallstatt duck and employ bossing as border designs or to accentuate the figures. The trail of the second group of features, the cauldrons and pails, the tee clamps, the free-swinging handles and the embossed decorative features seems perfectly clear from the Orient to Etruria, and by the trade route through Bologna and Este into Central Europe.

One or another feature, appearing in an isolated find or hoard of Central Europe, is scarcely sufficient to prove a change in culture. Where two or three distinctively Etruscan features occur together in the Final Bronze Age of Central Europe: either the disk and duck design linked with free-swinging handle, the riveted tee clamp together with bossed figure decoration, the pail or cauldron combined with pelican design or tee clamp, then it seems safe to say that these features reflect the Oriental elements. The disk-duck design well deserves the term of "Hallstatt Duck" even though it represents a stylized Etruscan duck or pelican and the sun-disk of Egypt, because it is adapted and popularized in Central Europe. Nevertheless, the Hallstatt phase of the Final Bronze Age might reasonably be termed the Orientalizing period of Central Europe. Many of the features were developed or adapted in Etruria, but they came straight through Italy to Central Europe and they caused as profound a change in the culture of Hallstatt as the direct Oriental contact did in Greece during the Orientalizing period. In Greece it was the pottery which was most obviously affected, in Central Europe, the bronzes.

Finally, because the Oriental elements came through the known cultures of Etruria, they furnish in Central Europe still more important evidence than in Greece for the history of cultural change, since the arrival and developments in Italy can be dated with some certainty. The bossing and studding of hammered bronze vessels was well established in Etruria long before 700 B.C. The free-swinging handle was at least as old as the Bocchoris tomb, circa 700 B.C., but probably did not become attached to the tee clamp until 650 (the second Benacci period). The sun disk of Egypt, the Uraeus, appeared early in Etruria, and the change to disk and pelican probably dates well before 700 B.C. A later development (after 700) was the adaptation of the polyheaded stylized animals of the cauldrons to engravings on urns and helmets. One may say that the period 700-650 B.C. marked the height of the early development in southern Etruria. It was this development which was transmitted through Benacci in Bologna, reached Este in the second period, and so moves into Europe and distinguishes the second part of the Final Bronze Age period.

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# Sophokles, Mikon and the Argonauts

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*PLATES 101-102*

The Ficoroni cista, that celebrated Italo-Etruscan bronze of the 4th century B.C., with its remarkable engraved decorations, has received much scholarly attention in the past, notably in the work of Behn, Fiehl and Marchese.[1] On finding a group of analogous illustrations of the cista theme, Amykos defeated in his match with Polydeukes, Behn concluded that these all derived from Mikon's painting on an Argonaut theme in the Temple of the Dioscuri at Athens. Behn's good work was, unfortunately, partially undone by Fiehl in 1913 when he demonstrated most effectively that the cista reflected a style of painting that post-dated that of Polygnotos and Mikon by nearly a century; the cista reflected work of the 4th century, argued Fiehl, not of the mid-5th.[2] While Fiehl, as a result of his perceptive investigations, contributed much to the clarification of the differences of style between Polygnotan and 4th century painting, he left the problem of the origins of these Amykos illustrations to be solved all over again, a project undertaken by Marchese in 1944. Although he too scored some insights, Marchese's conclusions left the subject more needlessly obscured than ever, as his final sentence declares: "La tradizione letteraria si può dire completamente perduta, la tradizione artistica non chiara." Things are not actually so hopeless, and perhaps a reconsideration of the evidence can clarify the matter once again. The work of Behn has not been completely damaged by Fiehl's dissertation, and indeed, can be salvaged, and further conclusions drawn from it.

Of the several extant examples of the Amykos-Polydeukes theme, the two fullest illustrations are on the Ficoroni cista, dated by Beazley the last third of the 4th century B.C., and on an Attic kalpis of about 440 B.C.[3] These, for the most part, give the theme as we know it from literature: Amykos, king of the Bebrycians of Bithynia, was accustomed to forbid all strangers to his coast to fetch water until they fought a boxing match with him. Until the arrival of the Argonauts, Amykos had invariably beaten his opponents to death. However, Polydeukes, one of the companions of Jason, defeated Amykos and in both these illustrations is shown tying him to a rock or tree.

At first sight the points of comparison between the two scenes seem so obvious that Behn hardly mentioned them, merely stating that they had a single visual prototype.[4] Fiehl, however, on much closer scrutiny showed that many of the figures of the cista were either of 4th century type or at least of post-Polygnotan invention. Certain specifically Polygnotan elements were retained—such as the use of eye-folds in the drapery, certain stances of figures with one foot raised higher than the other, or those that showed only a partial profile.[5] But in addition to these 5th century motives, there were also numerous 4th century or specifically Italiote elements and figures, as, for example, the type of Athena, the winged Nike and the Silen.[6] If we

[1] F. Behn, *Die Ficoronische Cista* (Rostock 1907). E. Fiehl, *Die Ficoronische Cista und Polygnot* (Tübingen 1913). L. Marchese, "Il Mito di Amico nell'arte figurata" *SE* 18 (1944) and pl. 8. E. Gerhard, *Auserlesene griechische Vasenbilder* (Berlin 1840-48) 3, pp. 15ff, pls. 153/54. See pl. 101, fig. 1.

[2] Fiehl's dating, first half of the 4th century, is too early for this, *op.cit.* (supra n. 1) 77. F. Behn, *op.cit.* (supra n. 1) 9. This is the dating also accepted by E. Pfuhl, *MuZ* 2, p. 793. Most recently J. Beazley has dated it as post 336 B.C, or at least the last third of the 4th century, and has based his date for it on the type of boxing-glove worn by Polydeukes, *JHS* 69 (1949) 2.

[3] Dating of the kalpis: A. Furtwängler, *Masterpieces* (New York 1895) 111. E. Gerhard, *op.cit.* (supra n. 1). L. Marchese, *op.cit.* (supra n. 1) 47, pl. 8, 2. See pl. 101, fig. 2.

[4] F. Behn, *op.cit.* (supra n. 1) 61, 65.

[5] E. Fiehl, *op.cit.* (supra n. 1) 9 and n. 3, 51ff, 60ff. Also F. Behn, *op.cit.* (supra n. 1) 26ff. L. Marchese, *op.cit.* (supra n. 1.) 71ff.

[6] E. Fiehl, *op.cit.* (supra n. 1) 12ff, 21ff, 34. s.v. "Satyros" in Roscher's *Lex.* IV, 485. E. Behn, *op.cit.* (supra n. 1) 29ff, 43. The winged Boread to the left in the cista is in a typical Polygnotan pose but his appearance is non-Greek. As F. Behn notes (p. 34) this is a type of figure that appears on Etruscan monuments. E. Gerhard, *Etruskische Spiegel* (Berlin 1843) 2, p. 223. It does seem as though the Etruscan artist had worked out some kind of cultural amalgam here and confused this Boread with the winged and shaggy-bearded Charon of local belief. s.v. "Charon" in Roscher's *Lex.* p. 886. M. Swindler, *Ancient Painting* (New Haven 1929) figs. 417-19, 422, 431. That this Etruscan-Italiote artist was working with material that was not entirely familiar to him is indicated, it would seem, by the fact that he converted the other Boread into a winged Nike, not realizing that both the Boreads accompanied

compare the other technical elements which Fiehl observes—namely the rounded fleshly forms, the advances in anatomical rendering, the new deepening perspectives and foreshortenings, the realistic landscape where figures and background are fused into a harmonious whole—then it becomes harder to accept the idea of a single source of origin for these two scenes.[7] Actually it should be no harder to accept this than it is to accept any theme that is rendered according to the variations of taste of several given periods: the inner structure of *Hamlet* remains whether produced by the Globe Theater, the Old Vic, or the cinema. While the kalpis depicts the Amykos scene in contemporary, purely classical form, the cista fuses these elements with the stylistic developments that already point to the beginnings of the Hellenistic baroque.[8] But it can be shown that underlying these surface variations there is the same basic structure and composition that was worked out by a single mind, and, demonstrably, a great one. Behn did not indicate what this structure was, Fiehl obscured it by overemphasizing the importance of the surface details, and Marchese simply saw less of the evidence than did his predecessors.[9] Behn's original conception must be spelled out, so to speak, so that the basic comparisons which he took for granted can be reasonably established; then there should be reason to believe, finally, that these illustrations point to a much more important source.

In the first place, in both scenes we have for the central figure of Amykos, the same great bearded barbarian with his hands bound behind his back and his knees bent.[10] Polydeukes has one knee bent and both arms engaged toward the king. On either side of this central group we find two seated Argonauts intently observing the action: in both scenes the one to the right (on the kalpis, a winged Boread) sits on a rock and holds a staff or lance,[11] while to the left, another Argonaut sits on a hydria. By his proximity to the central action and by the strigil he holds in his hand in the 5th century example, this figure would indicate that this is Kastor, the twin brother of Polydeukes, who would logically act as his brother's "trainer" in the fight.[12] In both illustrations hereafter we shall refer to this figure seated on the hydria as Kastor. Note that on the cista scene the strigil and Polydeukes' clothing are held by a little slave boy curled up at the foot of the tree. The boy is asleep and plays so minor a role (in fact he is barely visible) that he would readily be eliminated by a copyist concerned with simplifying the main scheme, as happened in the classical example.

Then to the right of both scenes again, there is the figure who stands to the left of the boat and intently watches the outcome. Because of his relation to the Argo and for other reasons to be considered later, he is, probably, Jason. In both scenes he is bearded, imposing, and leans on his javelins in close proximity to the ship.

To the left, on the 5th century vase, behind Kastor there stands a tall and majestic Bacchante wearing her nebris like an aegis and carrying her thyrsis like a lance; she is taller, straighter and markedly more grand in her bearing than her graceful female companion. I deliberately intend, of course, to suggest here the image of Athena as the earlier counterpart of the cista goddess with aegis and spear, who also raises her hand to her hip. The fact that these two female figures of divine carriage and proportions occupy different places in the composition need not trouble the argument too much. In the passage of a century we must expect some such transpositions, which, though they alter appearances a bit, do not essentially alter the fundamental aesthetic scheme. There are other such examples of transposed elements, or other modifications of the scene. Observe, for instance, how in the classical scene the oar occupies the same position and angle of projection as the ladder in the more complex version—again the same underlying structure rendered by a different motif. Yet at the same time the prows of both

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Jason as Argonauts and took part equally in the myth. The classical painter, with more understanding as to the identity of these winged figures, retained both in his scene.

[7] E. Fiehl, *op.cit.* (supra n. 1) 57ff, 64, 67, 71ff, 76. M. Swindler, *op.cit.* (supra n. 6) 218, 284, 336.

[8] E. Fiehl, *op.cit.* (supra n. 1) 77.

[9] Despite his investigations Marchese seems to have overlooked Fiehl's study, for he never refers to it.

[10] See pl. 101, figs. 1 and 2.

[11] This Argonaut with a javelin who sits to the right of Amykos is regarded as Jason by Behn, *op.cit.* (supra n. 1) 30ff; he also notes Etruscan and Italiote elements in his shoes and armband.

[12] E. Gerhard, *op.cit.* (supra n. 1) 17, regards this as Kastor. F. Behn, *op.cit.* (supra n. 1) 35, regards this as the Bebrycian, "Mygdon," the brother of Amykos, because he has a heavy head of hair and thus answers to the description of the "long-haired Bebrycians" mentioned in Theoc. *Id.* 22.77. The name of Mygdon, however, does not appear in any mention of this fight. Note also that the classical counterpart of this figure is a Greek of tidy appearance, quite in contrast to the barbaric king who is shaggy.

ships undeniably resemble each other, composed as they are of parallel curved pieces with a knob near the tip, as though both artists were reproducing a familiar model of the Argo.[13]

Observe further how the wings of the Boread to the left are deliberately placed in each picture to counterbalance by their mass and curve the prow of the Argo, itself suggesting an inverted wing. Note also how the wings of the intermediate winged figure, the other Boread and his Nike substitute, are kept simpler in mass and line so as not to interfere with the more dominant pattern of the curves of the other wings and prow. Thus, although the pattern of the three wing shapes is more widely spaced in the cista scene than in the earlier one, both the classical and the 4th century scenes have retained the same triple scheme of balancing mass and line. This is, admittedly, a scheme that could have been worked out only by a painter who thoroughly understood the structure of his craft.

Finally at the extreme left of both scenes there is the seated figure resting his arms or arm on his drawn-up knee. This covers the points of analogy between the two scenes, and they are enough to outweigh, for the time being, the differences, i.e., the seemingly supernumerary figures in each. Now let us scrutinize these odd additions more closely. To the left in the classical scene the artist has chosen to break off his scheme with the first maenad and has used the extra one and the satyrs merely as filling for his scene, where they do no more than duplicate the other maenad and the seated Kastor. Remove the beards and tails of the satyrs, slip another hydria under the dancing one, and what we see are actually *three Kastors*. Hence these figures do not alter; they merely reiterate. Nor are they new elements. However, in the cista scene, the intervening pair of men engaged in conversation seem so detached from the central action in both mood and composition that, for the time being, they must indeed appear like extraneous fill, more so than the classical satyr-group which at least has the compositional tact to look toward the central action.[14]

To the right, the classical scene breaks off at one of our points of comparison, at the juncture of the prow and the oar. But the cista goes on to fill out a larger scene with figures which, with one exception (and that the closest one to the central scene), again form no part of the main action. But even that solitary young man descending the ladder is too preoccupied with his boxes to add anything to the fight scene. This whole group beyond the boat, as well as the other large group just mentioned, again seems used merely as fill. Moreover, compositionally these damage the unity of the picture and break it into three parts. Let us not, however, be too hasty in regarding all these as "additions" and mere fill; nor should we apply aesthetic criteria here which are largely modern. Probably, and for reasons to be demonstrated, the original, ambitious prototype of the 5th century very likely did include these three groups, the Amykos combat and the Argonauts on either side fetching water. In which case, therefore, the Ficoroni cista, though later in date, comes closer to the source of its inspiration than does the simplified classical version. The kalpis painter found it best, under the limitations of his medium, to use the prow of the boat and its projecting oar as the logical point for breaking off his composition on the right side of the scene. On the left he also used a more limited scheme, merely breaking off with the Argonaut on the hydria and repeating the motif. And in preferring to substitute the satyrs and maenads for more Argonauts he showed, as we shall see, that he was also influenced from another source.

That the original prototype most probably also included the whole group which appears on the left is evidenced, it would seem to me, by the fact that the classical painter has used in his scene one of the figures from it, namely the youth appearing at the left end of the cista, who is bending to pick up the hydria, and whom he has substituted for the Polydeukes as he appears on the cista. Compare this kalpis Polydeukes with the cista one, whose action of tying up Amykos is perfectly clear and perfectly logical, while, in contrast, the action of the classical Polydeukes is markedly unclear. At first sight, because of his relation to Amykos, we assume that the classical Polydeukes is holding out his arms and doing something to the king, but actually he is drawing water, water that has not been depicted, or at least not effectively. Obviously this action has not been thought out clearly, par-

[13] The knob is probably meant to indicate the piece of wood from the speaking oaks in Dodona which Athena inserted into the prow of the Argo. (Apollonios Rhodios [hereafter A.R.] 1.527).

[14] F. Behn, *op.cit.* (supra n. 1) 47ff, regards the pose of this pair of youths as a composition "echt Polygnotisch."

ticularly in relation to Amykos; it has been borrowed but not properly adapted. The classical painter, for reasons of simplification, and perhaps in order to make his decoration more familiar and more readily saleable to his potential customer, substituted this water-gatherer from the left and used him for his own version of the Polydeukes; in this way he compressed both the fight scene *and* the water-fetching theme of the original into one centralized picture. The artist of the cista, working within a more generous framework and being a more ambitious and competent craftsman, decided to include the whole original composition of his prototype, one that was also well-known to the classical painter even though he had to transpose, compress and adapt it. But what finally also indicates that the cista scene is a reflection of an original scene which has been taken whole onto the circular side of this vessel without adaptations, is the way the artist has disposed of the various lances of the figures. It may be a tenuous argument perhaps, but in the end worthy of the standards of a master: note with what sensitivity he has disposed of these lances and the ladder so as to form a wide, splayed pattern that is angled inward and downward, like spokes toward Amykos, who is the hub of the scene. It is exactly this compositional detail which made it apparent to Robert that this scene did not really fit the circular scheme of a cista, but instead reflected a flat, rectangular composition, as in a mural.[15]

These figures of the cista, then, were not additional "fill," to cater, perhaps, to the tastes of a later and more complex age. They are part of the original scheme as composed by a mind great enough to conceive and execute a *composition* quite beyond the limitations and abilities of contemporary vase painters. But one need only remove the additional rocks and shrubbery, transpose a few elements, make the figures a little leaner, pull them a little apart from each other, and what we have is essentially the same original in both scenes. These two representations are as closely related as two manuscripts, which—though centuries apart, and with their texts partly missing and their scripts slightly altered, and though variously enriched and illuminated—when collated with the closest scrutiny can be recognized as belonging to the same family.

There is more evidence to show that the original had a long and influential history, for it survived on other objects, particularly Etruscan. There are several other examples of the central scene: Amykos lashed to a tree by Polydeukes, who braces his knee to the task and who is usually attended by one or more companions in attitudes like those appearing on the cista or kalpis.[16] Some of these illustrations are distinctly labelled, though employing Etruscan spellings for "Amykos" or "Polydeukes."[17] But several of these minor examples have other, sometimes even seemingly irrelevant elements, that betray the more complex, albeit by now very remote, sources. One cista from Praeneste has on its lid a satyr,[18] another satyr appears on an unpublished urn relief;[19] one mirror decoration adapts the lion's-head fountain of the Ficoroni cista;[20] while a third illustration includes a satyr-head, as though combining that with the fountain-head as they appear next to each other on the Ficoroni[21] cista. The former mirror illustration also includes a korykos, the punching-bag, which also appears on the celebrated cista and is used here in substitution for a hydria. The latter mirror also includes winged birds, an irrelevant motif, until we recall the winged Boreads. In this scene also, the seated youth holds a strigil in his hand. Usually

[15] C. Robert, *Die Marathonschlacht in der Poikile*, Hallisches Winckelmannsprogram #18 (Halle 1895) 102. F. Behn, *op.cit.* (supra n. 1) 24. See also p. 350.

[16] F. Behn, *op.cit.* (supra n. 1) 62ff, lists these, most of which are illustrated as a group by L. Marchese, *op.cit.* (supra n. 1) pls. 9, 10. There is no illustration available for Behn's #2, a cista from Praeneste, but its description is sufficient to justify its inclusion; see R. Schoene, *Annali d'Inst.* 38 (1866) 181 #62; F. Behn p. 62 #2; Marchese, 52-53 and n. 14. See also a relief from Perugia; G. Körte, *I rilievi delle urne etruschi* (Rome 1870-1916) 2 pls. 101, 35, a; L. Marchese 55, pl. 10, 2. A mirror from Praeneste: Sarti coll. #104; F. Behn p. 64 #7; L. Marchese 55, pl. 9, 1. A mirror: E. Gerhard, *op.cit.* (supra n. 6) V, 90; F. Behn 63 #4; L. Marchese 57, fig. 2. An Etruscan gem: A. Furtwängler, *Die antiken Gemmen* (Berlin 1900) 2 p. 274, pl. 61, 22; L. Marchese 56; F. Behn 65 #8. A mirror: E. Gerhard V, 91, 2; L. Marchese 54-55, pl. 9, 2. In his recent article, "Two Etruscan Mirrors in San Francisco" *AJA* 59 (1955) 277ff, Del Chiaro furnishes us with more possibilities for adaptations of this theme, although they are much less easily identified as such than the examples cited by Behn.

[17] One mirror, Behn, *op.cit.* (supra n. 16) #4, has one youth labelled "Polouces" and another "Castor," and the king, "Amukos." A gem, Behn #8, is inscribed "Amuche." A mirror, Behn #5, is inscribed "Amuke," "Pultuke." See pl. 102, figs. 3 and 5.

[18] *op.cit.* (supra n. 16) Behn #2.

[19] L. Marchese, *op.cit.* (supra n. 1) 59 and n. 21.

[20] F. Behn, *op.cit.* (supra n. 16) #4; L. Marchese, *op.cit.* (supra n. 1) fig. 2. See pl. 102, fig. 3.

[21] L. Marchese, *op.cit.* (supra n. 1) pl. 9, fig. 1. See pl. 102, fig. 4.

also the figures on these Etruscan examples are set on rocky terrain, and stylize the foliage of the naturalistic landscape into a formal wreath that rings the circular framework of the scene.[22]

We gain particular insight into the excellence of the original, however, when we contrast a figure of Kastor on an Etruscan scene[23] with his fifth century counterpart. The latter is a masterpiece of closed, classical form, an integration achieved by the repetition of the curved leitmotif adapted from the strigil. Note how the curve of this object is repeated in the contours of the head and neck, of the shoulders and thigh and in the shape of the hydria itself, a motif always curving and returning inward, thus keeping the silhouette of the figure self-contained and isolated. Did this pot-painter really invent this masterpiece of sentient line, or did he fall heir to it?

It seems reasonable to suppose, after the accumulation of all these analogies, examples and contrasts, that there existed, at least by the beginning of the 4th century, a large scale, impressive painting that was ultimately the source of inspiration for a series of Etruscan illustrations on the Amykos theme, one of which was an impressive work in its own right. The kalpis illustration, however, by its close compositional analogies with these later works, proves that this important prototype must have been in existence at least by the mid 5th century B.C., and that it must have been situated in Greece, most probably Athens, for the Attic pot-painter, a minor artisan, can hardly be expected to have traveled any distance to see this prototype. This would point then, to the original contention of Behn that this prototype was probably Mikon's mural of the Argonauts in the Temple of the Dioscuri.

We know of this work from ancient references only what Pausanias thriftily tells us, that Mikon painted a "scene of Jason with those who sailed with him to Colchis," and that he "bestowed most pains on Acastus and his horses."[24] This description, in one case, has led Robert to believe that the scene represented the leave-taking of the Argonauts on the Argo while attended by Pelias and Akastos, as Apollodoros describes them.[25] Klein, on the other hand, regarded the theme as the funeral games instituted by Akastos in honor of his father Pelias who was slain by Jason and Medea.[26] These seem like valid suggestions, but there are other possibilities which should be investigated.

First, let us see what can be done with this information from Pausanias, deducing from what we know of Mikon, and of the episodes that comprised the myth of the Golden Fleece. The work of Mikon, the great muralist of the mid 5th century, can hardly be distinguished technically from that of his equally great contemporary Polygnotos; one credits them interchangeably with the technical developments of their day. Their differences lay, rather, in their choice of subject matter and their conceptual approach to it. Although both used themes of important events from myth or history and employed large groups of figures, Polygnotos, as the painter of Ethos and reflection, preferred to show either the moment prior to the action or shortly thereafter. Mikon, in contrast, loved to depict the melée, the very action itself.[27] Hence, we might expect that any such scene of those who sailed with Jason to Colchis, attributed to Mikon rather than Polygnotos, would not be a quiet one. Robert's suggestion, therefore, that this Dioscuri theme treated merely of their departure, does not seem to me to be the logical choice; it is too static a theme.[28]

Of all the adventures and episodes the Jason myth employed, we ought instead to think of one which included the whole crew of the Argonauts, an episode which had action but nothing so obvious as a battle-scene, for in that case Pausanias would probably have specified the battle, as he did others. Hence, it was probably one of the scenes of single

[22] L. Marchese, *op.cit.* (supra n. 1) pl. 9, figs. 1, 2, 3; p. 57, fig. 2. See pl. 102, figs. 3, 4, 5, 6.

[23] L. Marchese, *op.cit.* (supra n. 1) pl. 9, 1. See pl. 101, fig. 2; pl. 102, fig. 4.

[24] Pausanias 1. 18. 1: "Μίκων δὲ τοῖς μετὰ Ἰάσονος ἐς Κόλχους πλεύσασιν· καὶ οἱ τῆς γραφῆς ἡ σπουδὴ μάλιστα ἐς Ἄκαστον καὶ τοὺς ἵππους ἔχει τοὺς Ἀκάστου."

[25] C. Robert, *op.cit.* (supra n. 14) 61ff, also wishes to include in the scene the daughters of Pelias, mentioned by Pausanias as painted by Mikon, although in what connection is not known, Paus. 8.11.3.

[26] W. Klein, *AEM* 12 (1888) 98.

[27] Polygnotos as painter of ethos: Arist. *Poet.* 2. 6. Arist. *Pol.* 5. 1340ᵃ, 37. Ael. *VH* 4.3. Mikon painted several battle-scenes which depicted the fight itself: "Theseus fighting against the Amazons," "Battle of Marathon" (a joint painting?), "Battle of the Centaurs and Lapiths." In contrast Polygnotos painted "The Taking of Troy," which from its description might better be entitled, "Troy Taken"; also, "The Underworld."

[28] F. Behn, *op.cit.* (supra n. 1) 48ff, and L. Marchese, *op.cit.* (supra n. 1) 65-66, are of exactly the opposite opinion. They find the Amykos scene "Polygnotan" because it no longer presents the action. But the vigorous action of Polydeukes tying up Amykos seems sufficient to attribute the scene to the activist Mikon.

combat, but with enough activity in it to be of thematic interest to Mikon, and one which required the Argonauts as spectators and let them loom large in the scene, large enough, indeed, to obscure somewhat the central point of activity. This would be especially the case if that composition itself decentralized the main action somewhat by having more than one focal point, as here on the cista (admittedly, at first sight it takes longer to focus on the central action of the cista scene than on the classical one). In contrast to the immediate clarity of the Amykos Bound on the classical scene, what Pausanias saw, or remembered he saw, was a general group in which the subject was not strongly centralized. Yet neither was it passive. In all likelihood, also, it was probably one of the less familiar episodes of the Jason myth, one whose title he might easily forget. Certainly the Amykos adventure fulfills all these requirements. But there are also other factors that make it the most likely choice.

This Temple of the Dioscuri was also known as the Anakeion, the feast of which, the Anakeia, seems to have been connected with the ceremonies celebrating the foundation of the gymnasium in the Academy. The festival is thought to have included athletic games and a procession in which the Athenian ephebes figured prominently.[29] The Argonauts, therefore, would have graced the edifice like so many athletic and heroic ephebes. Also, particularly appropriate for the decorations in such a building would have been some of the very elements included in this Amykos scene, such as the youth with the punching-bag (and incidentally, just why should an Argonaut be busy with it in the middle of the countryside while engaged in the task of fetching water?), the strigil, the waterspout gushing like a shower-bath, the heaps of discarded clothing and the very nudity of the figures. All these are details, but perfectly appropriate to the atmosphere of the wrestling scene and the gymnasium, symbols suggested by the subject matter and subtly included by a master designer. Some of these are included in the relief representation of the calendar month in which the Anakeia took place, namely a youth with a strigil and figures of Kastor and Polydeukes.[30]

Then, of all the themes suggested, most appropriate to the Anakeion would have been this theme of a boxing-match, an intra-mural sport, better suited to the gymnasium atmosphere than the funeral games suggested by Klein. Let us pause for a moment and consider his suggestion (for it was only that)[31] that the Mikonian scene may have depicted the funeral games held by Akastos in honor of his father Pelias after he had been duped to his death by Medea and Jason. Offhand, perhaps, the funeral games of Pelias would seem like quite valid subject matter, for they would combine the Argonauts with athletic games and the Anakeion, and would certainly more reasonably account for Pausanias' reference to the horses of Akastos than would the Amykos theme. To sum up the argument so far then, we may say that the Amykos theme and the funeral games of Pelias were both appropriate as decorative themes for this building. But the Amykos-Polydeukes theme is more appropriate, in a way that the Akastos-Pelias funeral games could never suggest. This can be explained best by reviewing the careers of the Dioscuri.

There were three major episodes in the dual career of these twins. One of these, their expedition against Athens after Theseus had carried off their sister Helen,[32] would not have been a likely theme for the Athenians to celebrate, and indeed, there is apparently no extant representation of it. The second episode was the one Polygnotos chose for his portion of the Temple decorations, namely the Marriage of the Leukippidae.[33] Polygnotos' version of this has been recognized on the vase by the

[29] Theodoretos, *De curatione Grecarum affectionum* (p. 885 ed. Schulze). J. Harrison and M. Verrall, *Mythology and Monuments of Ancient Athens* (London 1890) 160. L. Deubner, *Attische Feste* (Berlin 1932) 216, is of the opinion that this festival of the Dioscuri had some connection with the "Schiffsgötter," which would still quite nicely relate to the Anakeion an episode that featured the Argo.

[30] J. Harrison, *op.cit.* (supra n. 29) 153, 160, fig. 31, a relief from the old Metropolitan Church in Athens, which, incidentally, explains the presence of the cross added to the scene.

[31] W. Klein, *op.cit.* (supra n. 26) 98, makes this mention of the funeral games as a suggestion, but it was largely Harrison and Frazer who developed his idea into a solution of the question. J. Harrison, *op.cit.* (supra n. 29) 162, J. Frazer, *Paus.* 1, p. 166, combines this reference to Akastos together with the one referring to the daughters of Pelias painted by Mikon, and assigns these to the painting of the Argonauts in the Anakeion.

[32] s.v. "Dioskuren" in *RE*, sect. 72, p. 1094.

[33] Paus. 1.18.1, for "marriage" Pausanias uses "γάμον." As Harrison observes, the "marriage" is represented commonly in ancient art as in the Meidias painting, as the theft of the bride, *op.cit.* (supra n. 29) 161. One is also reminded of the representation of the marriage of Peirithoos which is also a rape scene.

Meidias Painter of the late 5th century.[34] In this scene the chariot groups of the twins play a predominant role compositionally, and aesthetically, also, they are what strike us most.[35] Let us recall for a moment Pausanias' description in the next sentence following his reference to the Leukippidae: ". . . Mikon has bestowed most pains on Acastus and his horses." Is it just possible that Pausanias meant "*Kastoron*" and not "*Akaston*"? It is significant, it would seem to me, that in no other ancient reference is Akastos associated with horses, whereas Kastor was famous for his skill in managing them. Homer, in speaking of the Dioscuri, and in fact in his only reference to them, describes Kastor as famous for his skill as trainer of horses and Polydeukes for his boxing.[36] In the Anakeion painting there was a painting by Polygnotos celebrating this arete of Kastor, there is the possibility too, that in this painting were the horses that Pausanias admired. It is also likely that the other portion of this Temple of the Dioscuri celebrated the arete of the other twin, Polydeukes' skill in boxing, his match with Amykos.[37]

This is what Behn conjectured, but he complicated the argument unnecessarily by assuming that the Anakeion also included a third scene, one not mentioned by Pausanias. Behn believed that since the Marriage of the Leukippidae involved both brothers while the Amykos adventure featured only Polydeukes, a third scene was needed to focus only on Kastor.[38] He took as the theme for this the death of Talos, and used as illustration the scene done by the Meidias Painter.[39] The central portion of this vase illustration shows Medea working her fatal magic on the bronze giant, Talos, who collapses into the arms of the Dioscuri. What Behn failed to realize was that neither Apollodoros nor Apollonios Rhodios, who give the most detailed accounts of this episode, ever mention the Dioscuri as participants in the Talos encounter. They state that Talos was slain either by Medea, or by Poeas, or that he accidentally bruised himself and died.[40] It is only in this particular scene by the Meidias Painter that the twins take any part at all, and furthermore, they are the only Argonauts who dare touch Talos. It is also noticeable how unusually dominant are these twins even though it is presumably Medea who is the slayer. For psychologically speaking—in the mind of the Meidias Painter—it was the twins who were the central heroes of the scene.

Then let us move to the left of the same scene, to the group which by now will need no introduction: the group of youths about the Argo. Here are the same Argonauts at rest, the ephebe on the same ladder;[41] the ship with its prow and its knob, the crosspieces, all these are much as we have seen them before.[42] Like the artist of the cista illustration, the Meidias Painter was borrowing from the same source, but at the same time that he was doing so, he was so deeply involved with the source of his inspiration, the Dioscuri paintings of

[34] *CVA* Br. Mus., fasc. 6. Group III, I, c. pls. 91-92. See pl. 101, fig. 7.

[35] The Meidias Painter achieves this striking effect with the chariot groups by employing a common technical device, one used by a painter like Matisse for example, who crowds his scene with richly variegated fabrics and patterns while leaving always at least one large monochrome area relatively free of details, which serves as a visual resting place in a complex, restless picture, and, hence, as a kind of focal point. Observe here the large and relatively plain surface of the forms of the horses as compared with the elaborate and restless draperies of the figures; the simplicity of one attracts while the multiplicity of the other distracts.

[36] *Iliad* 3. 243. Later, the poet Alcaeus associated both brothers with horses, Diehl 78, where he says, in Richmond Lattimore's translation, *Greek Lyrics* (Chicago 1955) 27: ". . . now in/kindliness of heart appear to me, Kastor and Polydeukes:/you who wander over the wide earth, over/all the sea's domains on your flying horses,/easily delivering mortal men from/death and its terror." This is as the Meidias Painter represented them, as delivering men from death, in his Talos scene. In the chest of Kypselos (Paus. 5.17.9) of the early 6th century B.C., it is Polydeukes who was depicted driving a chariot; Kastor is not mentioned.

[37] It is interesting to note on this point that although she believed that the Mikon painting represented the funeral games of Pelias, Harrison, *op.cit.* (supra n. 29) 162, was moved to remark: "It seems clear, anyhow, that Mikon did not select either of the two Argonautic adventures which are most characteristic of the Dioscuri—the boxing match with Amykos or the death of Talos." As for the Talos theme, see infra.

[38] F. Behn, *op.cit.* (supra n. 1) 67ff.

[39] A. Furtwängler, *FR* pls. 38/39 and Text I, 196ff. M. Swindler, *op.cit.* (supra n. 6) fig. 376. See pl. 102, fig. 8.

[40] Apollod. *Bibl.* 1.9.26. A.R. 4. 1670ff, and scholia on 4. 1638. A. Pearson, R. Jebb, W. Headlam, *Fragments of Sophocles* (Cambridge 1917) I, pp. 110ff. A. Furtwängler, *op.cit.* (supra n. 39) 199.

[41] It has been thought that the prototype for this kind of figure on the ship's ladder was the Echoiax in Polygnotos' painting of Troy in the Lesche at Delphi. But if, as there seems reason to believe, Mikon's Anakeion painting included this figure, it would then seem as if it were Polygnotos who was borrowing from his contemporary, for the Delphi paintings are accounted among the last works of Polygnotos, while the Anakeion paintings are regarded as among Mikon's earliest.

[42] The resemblance of this ship to the one on the frieze at Gjölbaschi-Trysa has also been noticed, O. Benndorf, *Das Heroon* (Vienna 1889) pl. 9, but it is not a very close one actually. G. Körte, *Jdl* 31 (1916) 266ff. F. Behn, *op.cit.* (supra n. 1) 36ff.

the Anakeion, that he felt compelled quite on his own to involve Kastor and Polydeukes with the Talos episode. Nor in so doing was the Meidias Painter taking unusual liberties with traditional themes, for vase painters commonly adapted and developed these tales. But since they were *minor* artists no one paid much attention to their innovations; normally no one felt inclined to take them up and thus gradually include them into the body of existing themes. It was usually only the innovations of major artists, dramatists, poets, etc., that gained such acceptance. Hence, we can very likely regard this involvement of the Dioscuri with the Talos encounter as a unique creation, a tour de force, of the Meidias Painter who was inspired to this by his repeated visits to the Temple of the Dioscuri. What would seem to give the story away is, as Behn has recognized, the fact that the Meidias Painter has deliberately adapted the composition of this vase painting from the prototype of the Marriage of the Leukippidae, but he has also included in it figures from both the Amykos episode *and* the Leukippidae: not only the whole boat group but also the heroic figure of the youth leaning on his javelin, comparable in stance and gesture of the hand to the Jason of the Argo; the two horses going in opposite directions are a shorthand version of the chariot-groups of the Marriage scene. Also, the woman fleeing in the lower right hand part in the Talos scene again has her counterpart in the Leukippidae illustration. The Talos painting is the eclectic work of a very skilled minor painter, but it is not the copy of the great original that Behn supposed.[42]

As a summary evaluation, I would state that I am convinced by the internal evidence of their composition that the Ficoroni cista and the kalpis scene have an identical source and that this source is probably the painting of Mikon. The main barrier to this attribution is, of course, Pausanias' statement about the horse of Akastos. To try to dispose of Pausanias as I have done, by suggesting the possibility of a verbal slip, is perhaps to employ a mode of argument which comes perilously close to pure speculation, yet Pausanias has been known to err before and it is difficult to attribute any sense or significance to his statement in the form it has come down to us. Then if we counterpose to it all the reasons that would make the Amykos theme a singularly appropriate decoration for the Temple of Dioscuri, the point I have been urging may seem more acceptable.

So far we have scrutinized only the visual possibilities of the prototype with very little mention of its literary origins. Actually the Ficoroni cista, the Attic kalpis, and even the minor Etruscan adaptations reveal that this prototype had certain odd and unique elements which are traceable to a specific literary source. According to most of the literary versions, Polydeukes punished Amykos in the very manner in which the king had been accustomed to treat his defeated opponents: he pummelled them to death.[43] Theokritos, however, has Polydeukes spare the king and require him merely to swear an oath that he will never again maltreat strangers.[44] Also, according to the scholia of Apollonios Rhodios, both Epicharmos and Pisander stated that Amykos was simply put in chains by Polydeukes.[45] It must have been this happier version that Sophokles used, and probably invented, for his satyr-drama entitled the *Amykos*, for, as Headlam states in his analysis of the fragments, such a bloodless ending was more suitable for a satyr-comedy.[46] What we have on the illustrations is the Sophoklean version: Amykos has been defeated and is being bound by Polydeukes until he can extract an oath from him, for it is unthinkable that the hero would proceed at this point to beat his helpless opponent to death. It is interesting to note in passing that the kalpis painter has not bound his barbaric giant to a tree but to a rock, in a Promethean fashion that suggests a parody of that Aeschylean Titan.

Marchese, however, in his study of these scenes rejects any Sophoklean influence, saying that the tone of the satyr-drama does not correspond to the solemn tone of the representation of the cista.[47] But unfortunately he does not otherwise account

[42] Apollod. *Bibl.* 1.9.20. A.R. 2, 1-97. Hyginus *Fab.* 17.

[43] Theoc. *Id.* 22, 27-134.

[44] Scholia to A.R. 2. 98. *Comicorum Graecarum Fragmenta* (II, p. 92, fr. 7 ed. G. Kaibel). L. Marchese, *op.cit.* (supra n. 1) 75-76.

[45] A. Pearson, R. Jebb, W. Headlam, *Fragments of Sophocles* (Cambridge 1917) 1, p. 71. There are only two fragments extant from the Amykos of Sophokles, one is from Athen. *Deipn.* 400 B, and the other which suggests a fight scene: "σιαγόνας τε δὴ μαλθακὰς τίθησι," "makes jaw-bones soft," Athen. 94 E.

[47] L. Marchese, *op.cit.* (supra n. 1) 79.

for the gay Silenos on the cista and the two satyrs and the maenads on the classical scene, not to mention the satyr elements previously referred to on the minor Etruscan objects.[48] All these, it would seem reasonable to believe, indicate the influence of a satyr-drama, most appropriately the *Amykos* of Sophokles. Behn and Fiehl, for example, found the presence of the Silenos on the cista as "unsuitable" simply because they did not know of the existence of this satyr-drama.[49]

It is probably Sophokles who is also responsible for the inclusion of Athena within the scene, even though the goddess is not likely to have appeared in the satyr-play. None of the literary accounts states that Polydeukes had any divine attendant in the course of the contest. On the other hand, Athena does support Jason in other episodes of the myth,[50] although not so closely as she did Perseus or Herakles for instance. But Sophokles probably had occasion to represent her in one or the other of his various dramas on Argonaut themes.[51] But whether any of these dramas was presented on the same day as his satyr-play, and thus served as the source of inspiration for the artist, we do not know. In any case, there is no denying that the patron goddess of the city was a suitable subject for inclusion in any large and distinguished mural of public prominence.

Finally, let me suggest one more literary possibility: in painting the figure of Jason,[52] the classical painter seems to reflect a conception of great Ethos and grandeur which may be purely Polygnotan but may also derive from an equally magnificent source. The *4th Pythian Ode of Pindar*, of 464 B.C., gives us a portrait of Jason sublime enough to parallel any of the great heroes of Homer and, it might be stated, to completely belie the Euripidean conception of that hero. From the Ode, let us extract the following lines:[53]

> ". . . And he came in his time,
> a man terrible with twin javelins;
> . . . . . .
> . . . . . .
> Nor did the glory of his streaming locks go shorn,
> but blazed the length of his back. Striding apace
> he stood, and tested his unfaltering will
> in the marketplace that filled with people."

It is something close to this that the classical painter mirrors; whatever his limitations, his Jason stands, if no more like a long-haired Achaean, at least with an unusually heavy crop of dark hair and full beard, with his twin javelins, his legs apart, surveying a scene filled with people. This image the Athenian pot-painter sensed, while for the 4th century artist, despite his technical superiority, it proved too subtle and too unfamiliar; he failed to see what he destroyed in making his Jason turn his back upon the scene.

This kind of influence upon influence can be traced in Attica with remarkable clarity and frequency at any given time prior to the complications of the Hellenistic Age. We are able to hypothesize in this way and to take so much for granted only because we are working with the creations of a unique community, at once so small and so culturally integrated that it was possible for every artist to keep his eyes and ears on everyone else's productions. Exactly this kind of cultural integration seems to have taken place here, so that a vision was created that involved Homer, Sophokles, Pindar, Mikon, the Meidias Painter, the unknown little pot-painter and, eventually, several artists of Etruscan Italy.

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[48] F. Behn, *op.cit.* (supra n. 1) 62 suggests that a Marsyas scene may have also been behind the origins of this scene and compares the figure of Amykos with the Marsyas on a relief vase, *AZ* 27 (1869) pl. 18. L. Marchese, *op.cit.* (supra n. 1) 61-62, 79, also reminds us of the figure of Sinis who was similarly bound, but he is more inclined to the belief that the flaying of Marsyas was the prototype. He thinks, for instance, that the strigil was really symbolic of the knife, and that such a scene would also account for the presence of the satyrs and the maenads.

[49] E. Fiehl, *op.cit.* (supra n. 1) 24. F. Behn, *op.cit.* (supra n. 1) 43, in attempting to account for the presence of the Silen, regards him as a local water-demon—an amusing paradox and most unclassical—a teetotalling Silen!

[50] Athena is repeatedly referred to as the builder of the Argo in A.R. 1.19, 110, 529; 2. 1187; 3. 341; 4. 583. She also twice aided the Argonauts to escape dangerous rocks, 2. 537, 598ff; 4. 959.

[51] F. Welcker, *Die griechischen Tragoedien* (Bonn 1839) 1, p. 77, includes a list of Sophoklean titles on Argonautic themes: *The Lemnian Women, The Colchidae, Scythians.*

[52] F. Behn, *op.cit.* (supra n. 1) 31ff, regards this as Herakles, as did E. Gerhard, *AZ* 3 (1845) 166.

[53] From the translation of R. Lattimore *Odes of Pindar* (Chicago 1947).

Addition to note 15: Since this article was set up it has been my good fortune to see the cista and observe the admirable skill with which the artist adapted this rectangular composition to the contours of his vessel. The composition divides into these four distinct groups, only one of which is visible from a single vantage point: 1) Amykos, Polydeukes with Boreas, Kastor and Athena. 2) Two figures on the left and the boat group. The boat, which terminates so abruptly in the rectangular scheme, when seen in the round seems naturally to disappear around the curve. 3) The boxer, Silen, drinker and figure to the right. 4) The same figure to the right again, two men embracing.

# Nickel in Ancient Bronzes

BY C. F. CHENG[1] AND C. M. SCHWITTER[2]

PLATES 103-104

SUMMARY

Nickel in significant amounts over 1% was a constituent of some bronzes made as early as 4000-3500 B.C. by the civilizations of Sumeria, Syria and the Indus Valley. Such artifacts were usually contemporary with other bronzes containing small amounts or traces of nickel, and a large number containing no nickel at all. But if the nickel content was not simply an inadvertent impurity, no pattern of use suggests a deliberate use of alloy other than that nearly all of the identifiable objects were tools and implements in which strength and hardness were of importance, and were wrought rather than cast. A source of nickel available to these occidental smiths could not be definitely established, but may have been Oman, bordering on the Arabian Sea.

Similar low nickel bronzes were sporadically produced in China as early as the East Chow Dynasty (770-249 B.C.). Much higher nickel contents were encountered in Bactrian coins minted in 170 B.C. and these are proven to have derived from the Hweili deposits of Sikang Province, China.

## INTRODUCTION

Man emerged from the primitive savagery of the stone age with the discovery of the use of metals. At first he was limited to those found in their native state, notably gold, silver, copper, iron from meteorites and possibly tin. Much later came the art of extraction from ores, and with it such additional metals as lead, zinc, mercury and iron in relative abundance. Because gold and silver were precious and relatively scarce even in such early days, copper and its alloys with tin, zinc and lead were favored for utilitarian weapons and tools of the bronze age. Iron later took over this field, not necessarily because it was more plentiful but because it was stronger, harder and tougher. It made better tools and weapons, if care was taken to prevent its annoying tendency to rust and corrode.

Unlike these other metals, nickel was discovered as an element only in 1751; nevertheless early history gives indication that it was used generations before the birth of Christ by artisans who were possibly aware of some of its attributes although entirely unsuspecting of the metal with which they dealt. An attempt has been made in this paper to trace the beginnings of use by man of one of the most commonly employed metals of modern civilization, nickel.

## EARLY BRONZES CONTAINING NICKEL

Many ancient bronzes contained nickel. Since it is sometimes associated with copper in the types of ores available to ancient man, a small percentage of nickel, less than about 1% can be considered an inadvertent impurity. In quantities greater than 1%, however, the effect of nickel as an alloying element becomes noticeable, and it is not preposterous to suspect that some ancients may have developed a preference for certain types of copper or its ores which, because of the presence of appreciable amounts of nickel, proved more effective for implements and weapons than ordinary copper or bronze.

Syrian bronzes have been recovered from two sites in Amouq (the plain of Antioch) in Northwest Syria by the 1932-38 Syrian Expedition (1). At the Amouq site the cultural sequence from circa 5000 to 2000 B.C., appeared as a succession of ten phases, designated by the expedition as phases A through J. Copper tools made their first appearance in phase F (circa 3500-3100 B.C.), although some pieces came from a disturbed context, called the "First Mixed Range," which lay between phases C and F in one of the operations. By phase G (circa 3100-2800 B.C.) contemporary with the first Egyptian dynasty, a fairly elaborate industry in metal is attested.

The First Mixed Range supplied a number of pin-like copper artifacts which were designated as reamers. More elaborate artifacts such as needles,

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chisels, pins, maces, knives and small human figurines were found in later phases. Qualitative spectrochemical examinations were reported for all the objects; in a series of twenty-seven reamers produced from about 3500-2000 B.C. arsenic and nickel ranged from negligible quantities to about 2%. Tin was absent in eighteen of the reamers; it was present erratically in reamers from later phases.

Six reamers were more extensively examined. The chemical analyses given in Table I show that nickel ranged from .93 to 2.73% in four of the six specimens. The sixth, containing 8.5% tin, and

TABLE I

CHEMICAL COMPOSITION OF SYRIAN BRONZES (Ref. 1)

| *Description of Object* | *Phase Period* | *Approx. Date* B.C. | *% Composition* | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | *Ni* | *Cu* | *Sn* | *Pb* | *As* | *Co* |
| Reamer 1 | C to F | 4000–3100 | 0.93 | 95.53 | N.D. | 0.003 | 1.35 | 0.05 |
| " 2 | F | 3500–3100 | 2.73 | 94.12 | N.D. | 0.001 | 2.05 | N.D. |
| " 3 | G | 3100–2800 | 1.20 | 93.73 | 1.52 | 0.003 | 0.45 | N.D. |
| " 4 | H | 2800–2500 | 0.39 | 96.10 | N.D. | 0.03 | 0.40 | N.D. |
| " 5 | I | 2500–2200 | 2.73 | 93.99 | N.D. | 0.01 | 1.62 | 0.02 |
| " 6 | I | 2500–2200 | 0.16 | 88.51 | 8.51 | 0.01 | 0.04 | N.D. |

N.D. = Not detected in spectographic analysis.

found at a different site, was very likely remelted from cast scrap, since one characteristic of these bronze artifacts seems to be that tin was consistently added to castings in the later stages of the art, but appeared only erratically in wrought objects. The specimens are too few, and the period of time represented by the artifacts too great, to permit any conclusion regarding a deliberate alloying intent, but one fact does appear clear. Nickel was present in quantity sufficient to exert an alloying effect only in the wrought reamers, and not in several cast figurines also examined.

Sumerian bronzes found in Iraq and Egypt, containing nickel up to 3.34%, also date back to approximately 3500 B.C. Many of these have been analyzed. Table II tabulates all those bronzes containing over 1% nickel which are recorded in the reports of the Sumerian Copper Committee (3) and in Woolley's reports of Ur published elsewhere (2). It is interesting to note that every one of the objects in Table II which is identifiable has been wrought and annealed.

Indian bronzes excavated at Mohenjo-daro in Sind date back to the time of the Indus Valley Civilization of 4000-3000 B.C. Analyses of these were reported by C. H. Desch to the Sumerian Copper Committee (3.7) and many incorporated in Sir John Herbert Marshall's complete report (4) of the archeological investigation. Table III contains the analyses of those bronzes found to contain over 1% nickel. These are decidedly few compared to the number examined; many contained less than 1% nickel and the majority little or no nickel at all.

Of exceptional interest is the unidentified object reported to contain 9.38% nickel. Attempts by the authors to find this specimen and verify its analysis have failed. It is no longer in the British Museum, and the original records of its analysis are lost.

Speculative interest is aroused by the very lack of plan or pattern in the occurrence of these bronzes containing one or more per cent of nickel. Those bronzes recorded in Tables II and III have been selected from rather extensive groups, most of which contain nickel in less than significant amounts or none at all. It may be argued that the period of time represented by any one group of objects is enormous, encompassing several hundred

TABLE II

CHEMICAL COMPOSITION OF VARIOUS SELECTED SUMERIAN BRONZES (Ref. 2, 3)

| *Description of Object* | *Specimen Number* | *Place Found* | *Approx. Date* B.C. | *Composition %* | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | *Ni* | *Cu* | *Sn* | *Pb* | *Fe* | *Ref.* |
| .... | A | Ur | 3500 | 2.20 | 84.18 | 12.00 | 1.62 | .... | 3.2 |
| .... | Mound A | Kish | 3000 | 3.34 | 94.01 | 0.43 | 0.58 | 1.31 | 3.2 |
| Sheet Metal Statue of Peppy I | | Cairo Museum | .... | 1.06 | 98.20 | .... | .... | 0.74 | 3.2 |
| Axe | .... | Ur | 3500 | 1.11 | .... | 15.1 | T | .... | 3.3 |
| Trowel | .... | British Museum | 3500 | 1.61 | .... | .... | .... | .... | 3.3 |
| Spear | U12239 BMLIII | Ur | 3500 | 1.36 | 97.2 | 0.56 | T | .... | 3.4 |
| Axe (3 lbs.) | | | 3000 | 1.28 | 97.35 | .... | 0.17 | 0.15 | 3.4 |
| Pin | As.32.1027 | Tell Asmar | .... | 1.68 | 85.15 | .... | .... | .... | 3.5 |
| Pierced Pin | KhIII 1072 | Khafaji | 3000 | 1.42 | 93.65 | 0.29 | .... | .... | 3.5 |
| Axe-head | 2 | Ur | 3500 – 3200 | 1.29 | 79.46 | 8.1 | T | 0.15 | 2 |
| Square Pin | 4 | Ur | 2700 – 2600 | 1.77 | 94.41 | .... | T | 0.03 | 2 |
| Round Pin | 5 | Ur | 2700 – 2600 | 1.45 | 92.89 | 1.0 | .... | 0.5 | 2 |
| Round Pin | 6 | Ur | 2700 – 2600 | 1.43 | 92.95 | 0.1 | 0.04 | 0.02 | 2 |

T — Trace

TABLE III

CHEMICAL COMPOSITION OF SEVERAL INDIAN BRONZES (Ref. 3.7, 4)

| *Description of Object* | *Specimen Number* | *Excavation Date* | *Composition %* | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *Ni* | *Cu* | *Sn* | *Fe* | *Pb* | *S* | *Ref.* |
| Lump (unaltered) | | 1926 | 1.27 | 96.67 | 0.0 | 0.03 | 0.02 | 0.98 | 4 |
| Lump (partly oxidized) | | 1926 | 1.06 | 92.49 | 0.37 | 1.51 | T | 2.26 | 4 |
| Unknown | HR 1472 | 1926 | 1.49 | bal. | .... | .... | .... | 0.23 | 4 |
| Plate (from Baluchistan) | | 1927 | 1.77 | bal. | Nil | .... | .... | .... | 4 |
| Unknown | 9549 | 1927 | 1.9 | bal. | 1.2 | 4.1 | T | .... | 3.6 |
| Unknown | L 3767 | 1926 | 3.34 | bal. | .... | .... | 0.30 | 7.77 | 4 |
| Unknown | SD 1932 | 1926 | 9.38 | bal. | 0 | .... | T | 1.73 | 4 |

T — Trace

or even a thousand years, imperfectly dated at best, during which profound changes in the art of manufacture as well as changes in the source of raw materials may have occurred. It seems nevertheless strange that an occasional object, discovered together with other bronze objects which can be assumed to be contemporary, should contain nickel in such quantity that the raw material for its manufacture could scarcely have been derived from the same source as supplied the other objects, and hence the nickel content cannot be readily explained away as simply a fortuitous impurity. And yet, if the use of copper containing nickel was not fortuitous but was rather a deliberate act, some pattern of use should be apparent. The nearest approach that can be made is that most of the objects

containing nickel were wrought objects, and also were tools in which strength and hardness were important attributes. But this too is inadmissible as more than speculation in the face of a preponderant number of contemporary wrought and cast articles in which strength and hardness were equally important, but which contained little or no nickel.

### EARLY CHINESE BRONZES CONTAINING NICKEL

Chinese bronzes were investigated by Masumi Chikashige at Kyoto Imperial University, Japan in the 1920's. He found nickel contents ranging from 1 to 5% in weapons, mirrors and coins dating as early as the Eastern Chou period (770-249 B.C.) as recorded in Table IV (5). Another series of results was published by S. Matsuno in 1917 (6) working under Dr. Chikashige's direction. These analyses were reported in triplicate and are essentially identical with those of Table IV.

Other investigators, notably Liang and Chang (7), Dono (8), Komatu and Yamanouti (9), Umehara (10 & 11), and the Imperial Mint at Osaka (12), were unable to find significant quantities of nickel in any of many ancient Chinese bronzes subjected to analysis.

Using an X-ray fluorescent technique described in the appendix, the authors selected specimens comprising an ax-head, spear head, battle axe, axe blade, short saw and cross bow release of the Chou and Han periods from the Laufer collection at the American Museum of Natural History and analysed them for nickel. Very little was present. Similarly, a number of Chou coins of the late spade (340-325 B.C.), early knife (circa 522 B.C.) and late knife (circa 300 B.C.) and round (250-221 B.C.) types borrowed from the American Numismatic Society were subjected to non-destructive examination. The results are shown in Table V. The accuracy of this method depends upon the surface condition of the specimen. Thus those heavily coated with patina or severely corroded do not give very reliable results. To check the accuracy of the method a Ming knife with a fairly clean

TABLE IV

CHEMICAL COMPOSITION OF VARIOUS SELECTED CHINESE BRONZES

(after Chikashige (5) and Matsuno (6))

| *Description of Object* | *Period & Date* | *Composition %* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Chikashige's Analyses:* | | *Ni* | *Cu* | *Sn* | *Pb* | *Fe* | *Sb* | *As* |
| Sword | East Chow 770–249 B.C. | 2.47 | 73.34 | 19.84 | .... | .... | 3.80 | 0.55 |
| | or Han 208 B.C.–220 A.D. | 3.52 | 69.31 | 12.55 | 7.92 | 1.37 | 2.30 | 3.01 |
| Sword | – ditto – | 2.93 | 66.60 | 14.13 | 1.32 | 0.09 | 1.93 | T |
| Sword | Han 208 B.C.–220 A.D. | 1.05 | 71.93 | 16.19 | 10.83 | .... | .... | .... |
| Arrow-head | – ditto – | 3.68 | 74.47 | 10.82 | .... | 3.03 | 8.00 | T |
| Arrow-head | – ditto – | 2.04 | 73.12 | 16.15 | .... | T | 8.69 | T |
| Arrow-head | – ditto – | 1.51 | 69.89 | 23.40 | 5.20 | .... | .... | .... |
| Arrow-head | – ditto – | 1.41 | 80.83 | 8.80 | 8.62 | .... | 1.04 | .... |
| Spoon (Korean) | 7th Century A.D. | 2.19 | 73.77 | 24.04 | .... | .... | .... | .... |
| Knife Coin | East Chow 770–249 B.C. | 1.03 | 38.38 | 1.66 | 55.41 | 2.66 | .... | 0.60 |
| Knife Coin | – ditto – | 1.63 | 45.93 | 2.12 | 48.60 | .... | .... | 1.72 |
| Knife Coin | – ditto – | 5.08 | 42.25 | 2.12 | 47.32 | .... | .... | 3.28 |
| Knife Coin | – ditto – | 3.04 | 64.65 | 6.76 | 21.25 | 6.41 | .... | 3.88 |
| Mirror | Han 208 B.C.–220 A.D. | 1.83 | 92.99 | 24.12 | 3.27 | .... | .... | 2.63 |
| Mirror (Japan) | 5th Century A.D. | 1.52 | 67.03 | 22.45 | 8.99 | .... | (Other) | (Zn) |
| Mirror | *17th Century A.D. | 3.13 | 57.92 | 5.53 | 7.57 | 1.75 | (1.05) (Other) | (23.05) |
| Mirror (Korean) | *Ancient | 2.57 | 64.57 | 21.63 | 9.57 | .... | (1.22) | 0.44 |
| Bell (Japan) | 8th Century A.D. | 1.35 | 68.96 | 15.45 | 5.63 | 0.04 | 8.32 | T |

T — Trace

* — These two analyses reported only by Matsuno, all others by either Chikashige or both Chikashige and Matsuno.

surface was analysed both by X-ray fluorescence and by the conventional wet method. The results are tabulated at the bottom of Table V, and are in rather good agreement.

TABLE V

CHEMICAL ANALYSIS OF CHINESE BRONZE COINS
DETERMINED BY X-RAY FLUORESCENCE

| (1) *Kind & Classification of Coin* | *Date* B.C. | *Condition of Coin* | *Composition %* | | | | | (2) |
|---|---|---|---|---|---|---|---|---|
| | | | *Ni* | *Cu* | *Sn* | *Pb* | *Fe* | *Total* |
| Late Spade I | 340–325 | some patina | 0.25 | 29 | 1.8 | 62 | 0.5 | 93.55 |
| Early Knife (large) Chi Mo | ca 522 | fairly clean | 0.18 | 50 | 12.5 | 36 | 0.3 | 98.98 |
| Early Knife (large) An Yang | 412 | dark surface | 0.21 | 40 | 11.5 | 30 | 0.4 | 82.11 |
| Late Knife (Sharp pointed I) | 400 | dark surface | 0.20 | 58 | 13.0 | 17 | 0.05 | 88.25 |
| Late Knife—Ming I | ca 300 | little patina | 0.17 | 40 | 0.05 | 62 | 0.3 | 102.52 |
| Late Knife—Ming II | ca 300 | thick patina | 0.17 | 50 | 3.0 | 27 | 0.9 | 81.07 |
| Late Knife—Han-tan | ca 300 | thick patina | 0.22 | 51 | 6.0 | 24 | 0.4 | 81.62 |
| Round—Spade Area (Chin) | 250–221 | little patina | 0.21 | 70 | 3.5 | 23 | 0.4 | 97.31 |
| Late Knife—Ming II (X-ray F) | ca 300 | little patina | 0.18 | 66.25 | 8.5 | 25 | 0.3 | 100.23 |
| Late Knife—Ming II (wet method) | ca 300 | little patina | 0.10 | 62.52 | 9.25 | 25.52 | 0.10 | 98.49 |

(1) — Classification according to Wang Yu-Chuan in Early Chinese Coinage, The American Numismatic Society, Numismatic Notes and Monographs No. 122, 1951.
(2) — Presence of surface patina responsible for fact that total is other than 100%.

There is reason to believe that "white copper," either as ore or as metal pigs, was available to Oriental artisans, in contrast to the presumed absence of such raw material in the western world of Sumeria and Egypt. The failure of investigators other than Chikashige and Matsuno to find nickel in significant quantities in oriental bronzes therefore suggests only that a random and unpredictable portion of the objects available from any one period contained nickel. Although recipes (5) for various bronzes did exist at the time and were rather scrupulously followed, it seems obvious that none of these could have prescribed "white metal' as an ingredient.

### EARLY REFERENCES TO PAITUNG-WHITE COPPER

A distinctive Chinese cupro-nickel alloy called "paitung" in Chinese official Mandarin dialect or "paktong" in local southern Cantonese dialect, and meaning "white copper," was well known to the western seamen who called on Chinese ports during the 18th century. It was a complete novelty to the western world and sold well as an inexpensive substitute for silver. The demand inspired Geitner (14) of Saxony to produce a similar cupro-nickel, which he named "argentan" in 1824. The brothers Henniger (13) of Berlin placed imitation "paitung" on the market also in 1824. And in 1832 Henry Merry and Charles Askin of Birmingham (13) produced on a commercial scale from refined nickel, copper and zinc an efficient substitute for "paitung" known as Merry's "metal blanc."

The origin of the Chinese name paitung is of critical historical importance. Collins (15) has stated that, according to Chinese commentators the common name "tung" made up of the radicals "Chin" and "tung" indicates soundness, harmony and assembly i.e. alloy in the modern metallurgical sense. Thus the character "tung" has been loosely used for any alloy of copper since early times. As their knowledge of metallurgy progressed, the Chinese distinguished refined copper as Chi-tung (red copper); brass as Huang-tung (yellow copper); bronze as Ching-tung (green copper); and cupro-nickel as "Pai-tung" (white copper). These are reasonably precise, modern terms.

Tracing backward in time, however, it is found that in A.D. 230 (16), the term "paitung-white copper" appeared in the dictionary Kwang Ya (17) compiled by Chang I as a definition of the character "Wu." This ended an ambiguity which had existed for generations. H. T. Chang (18) has

pointed out that both Mao Chang of the second century B.C. and Cheng Huan of the second century A.D. paraphrased "Wu" as "paichin" meaning simply "white metal," and in the 5th century B.C., this term was referred to as "yen (silver)" in the dictionary Urh Ya (19). In the Han period (208 B.C.-A.D. 220), it was used for both "white copper" and silver-tin alloys (18).

The character "Wu" appears in the first and second chapters of Seaou Jung of the Odes of Tsin (20) the first of three volumes comprising the Book of Odes, oldest known Chinese classic. Karlgren (21) and others believe it was compiled for the most part in the Western Chou time (1027 B.C.-771 B.C.), a few of the Odes slightly later, but none later than the 6th century B.C. Since the Odes of Tsin are contained in the first of three volumes, it is safe to assume that the reference to "Wu" was written prior to the 7th century B.C.

Following is Legge's translation (20) of the Odes of Tsin where the character "Wu" appears in Stanzas 1, 2 and 3 of Seaou Jung.

St. 1. (There is) his short war carriage;—
With the ridge-like end of its pole, elegantly bound in five places;
With its slip rings and side straps;
And the traces attached by *gilt* rings to the masked transverse;
With its piebalds, and horses with white left feet.
When I think of my husband (thus),
Looking bland and soft as a piece of jade;
Living there in his plank house;
It sends confusion into all the corners of my heart.

St. 2. His four horses are in very fine condition,
And the six reins are in the hand (of the charioteer).
Piebald, and bay with black mane, are the insides;
Yellow with black mouth, and black, are the outsides;
Side by side are placed the dragon-figured shields;
*Gilt* are the buckles for the inner reins.
I think of my husband (thus),
Looking so mild in the cities there.
What time can be fixed for his return?
Oh! how I think of him!

St. 3. His mail-covered team moves in great harmony;
There are trident spears with their *gilt* ends;
And the beautiful feather-figured shield;
With the tiger-skin bow-case, and the carved metal ornaments on its front.
The two bows are placed in the case,
Bound with string to their bamboo frames.
I think of my husband,
When I lie down and rise up.
Tranquil and serene is the good man,
With his virtuous fame spread far and near.

In each case Legge has used poetic license in translating "Wu" as gilt. Karlgren (22) on the other hand translates "Wu" as "silvered." If the definition given by Chang I is accepted, "white copper" would be the only suitable translation. But it has been established that before Chang I's dictionary was written the character "Wu" could be used for several alloys white in appearance. Consequently this poetical reference may have meant white copper, or a silver-tin alloy, or even silver itself. Logic suggests that the bridle hardware of these early day war chariots would have been cupro-nickel rather than a silver alloy because of its greater strength. Logic more strongly suggests that the white metal spear points mentioned in Stanza 3 were made of "white copper" rather than silver for an even more practical reason. No warrior of those times, critical of his weapons and equipment, would have gone into battle with a spear equipped with silver points if bronze were available to him, for the very fundamental reason that the relatively soft silver or silver alloy would have been ineffective against an armored enemy. Lacking steel, bronze would be the warrior's choice. Ordinary bronze might do, but since the reference is precise, at least in describing the metal as white, the most likely supposition is that the poem refers to one of the earliest uses of nickel bronze known to man.

### *The Bactrian Coins*

The earliest cupro-nickel objects which are known to have survived to the present day are coins minted in Bactria about 170 B.C.

The life of the Kingdom of Bactria was extremely brief and very little accurate knowledge of it re-

mains today. It was located in the northwestern section of India, roughly corresponding to Afghanistan. The Greeks under Alexander the Great superimposed their civilization upon it in 326 B.C. The cupro-nickel coins of Bactria were issued during the reigns of sub-kings Euthydemus II, Agathocles and Pantaleon. Percy Gardner (23) places the reign of Euthydemus II at about 170 B.C. and those of Pantaleon and Agathocles about 160 B.C.

Chemical examination of Bactrian coins was made as early as 1868 by Dr. Flight (24). He analysed a coin of Euthydemus II, which revealed the following composition:

| Cu | Ni | Co | Fe | Sn | S | Ag | Total |
|---|---|---|---|---|---|---|---|
| 77.585 | 20.038 | 0.544 | 1.018 | 0.038 | 0.090 | Tr | 99.313 |

He also qualitatively examined two other Bactrian coins (Euthydemus II and Agathocles) and found them to contain a "considerable amount" of nickel. Dr. Flight separated nickel from cobalt by Liebig's process (25), dissolving nickel in acid potassium cyanide solution and filtering off the cobalt. According to modern standards this method may give high results for nickel.

With the aid of non-destructive analysis by X-ray fluorescence, it was possible to examine a number of cupro-nickel and copper Bactrian coins from the American Numismatic Society and the American Museum of Natural History in New York City as well as one in the International Nickel Company's collection. For comparison against the wet method of analysis, a "paitung-white copper" wine pot lid from the American Museum of Natural History (Dr. Laufer's China collection) as well as a piece of commercial 90-10 cupro-nickel alloy were analysed by both X-ray and wet methods. The results are tabulated in Table VI. The values by the two methods check closely.

TABLE VI

CHEMICAL COMPOSITION OF BACTRIAN COINS

(Analyses by X-ray Fluorescence Unless Otherwise Indicated)

| *Name of Coin* | *Specimen Number* | *Ownership[a] of Coin* | *Composition %* | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *Ni* | *Cu* | *Pb* | *Fe* | *Co* | *Zn* | *Others[b]* |
| *Cupro-Nickel Coins* | | | | | | | | | |
| Euthydemus II | 2A | ANS | 8.6 | 72.5 | 5.4 | 1.1 | 0.4 | 0.3 | 11.7 |
| Euthydemus II | INB | Inco | 9.5 | 79.3 | 6.3 | 1.6 | 0.6 | 0.1 | 2.6 |
| Pantaleon | 4A | ANS | 10.5 | 72.0 | 5.4 | 1.3 | 0.6 | 0.3 | 9.9 |
| Agathocles | 5A | ANS | 13.8 | 66.2 | 7.8 | 1.1 | 0.7 | 0.3 | 10.1 |
| Agathocles | 6A | ANS | 13.5 | 62.5 | 8.1 | 1.8 | 0.8 | 0.3 | 13.0 |
| *Copper Coins* | | | | | | | | | |
| Euthydemus II | 3A | ANS | 0.2 | 87.5 | 0.2 | 0.4 | ND[c] | 0.3 | 11.4 |
| Euthydemus II | 4M | MNH | 0.2 | 89.0 | N.D. | 0.3 | ND[c] | 0.1 | 10.4 |
| *Paitung-White Copper* | | | | | | | | | |
| Wine Pot Lid | PW | MNH | ....[d] | 50.0 | 3.7 | 1.1 | 0.2 | (40.4)[e] | .... |
| Wine Pot Lid (wet method) | PW | MNH | 4.60 | 49.38 | 3.67 | 1.08 | 0.1 | (41.17)[e] | 2.33 Sn |
| *90-10 Cupro-Nickel* | | | | | | | | | |
| Flat Bar | 16602 | Inco | 11.7 | 85.1 | .... | 1.25 | .... | .... | .... |
| Flat Bar (wet method) | 16602 | Inco | 11.50 | 85.83 | .... | 1.26 | .... | .... | .... |

(a) — ANS — American Numismatic Society
MNH — Museum of Natural History
Inco — International Nickel Company

(b) — Others — by difference including non-metallics, largely oxides and under 1% metallics (e.g. W, As, Sn); absence of Pt. metals, Mo, Mn, Bi, Sb, Cr)

(c) — Not detected by X-ray fluorescence

(d) — Value omitted due to high zinc interference

(e) — By difference (nickel 4.60%, Sn 2.33%)

The column "others" by difference in Table VI is intended to show non-metallics (largely oxides of copper) and metallic elements totalling less than 1%. These are tungsten, arsenic, and tin, not easily detectable by X-ray fluorescence. The absence of platinum metals, molybdenum, manganese, bismuth, antimony and chromium has been definitely established. The low value of 2.6% in this column for specimen INB is attributed to the fact that this particular coin is the only one of the lot that had been cleaned cathodically thereby removing most of the surface oxide layer. It substantiates the premise that the unaccounted-for per cents totalling 100 in "others" are largely non-metallics.

Microexamination was made by the authors of a Bactrian coin of Euthydemus II (Specimen INB, pl. 104, fig. 1). Plate 104, fig. 2 is a photomicrograph of a transverse cross-section of the edge of the coin showing the direction of stamping and the depth of corrosion from the surface (0.008/-0.012") at 25 magnification. Figure 3 shows the same cross-section at 250 magnification. Patches of copper oxide exist ($Cu_2O$) in the grains and at the grain boundaries. The original cast structure is fairly well broken up, apparently by stamping the coin while still red hot but cool enough to retain evidence of cold work, as revealed by the strain lines of the matrix.

It is interesting to note that so far only coins of Euthydemus II, Pantaleon, and Agathocles have been found to contain nickel. These cupro-nickel coins also contain 5 to 8% lead, 1 to 2% iron and ½ to 1% cobalt whereas contemporary copper coins reveal insignificant amounts of these three elements. This indicates the nickel did not come from the same source as the copper coins.

*Sources of Nickel*

Having established that nickel was present in varying degree in various copper and bronze articles of both early oriental and occidental civilizations, it is natural to inquire from whence it came. The search is clouded by the possibility that some of the ore bodies worked by the ancients may have become lost over the centuries. The Sumerian Copper Committee conducted a considerable search for sources of the copper ores used by the early Sumerians, on the theory that nickel was frequently present in the earliest specimens of copper and bronze, and that therefore a copper ore containing nickel should be the objective of such a search. No conclusions were reached by the Committee although considerable data were accumulated. For the purposes of the present paper it must suffice to review the known deposits of nickel-containing ores.

The characteristics of these various ore bodies have been tabulated in Table VII. The available information is fragmentary and to a geologist or mining engineer would raise more questions than answers. But for the purpose of this paper it permits several deductions to be made. One thing is certain. There is not enough information to determine the source for nickel in the various low nickel bronzes described in this paper. The Oman deposits are most likely, but considerably more analytical proof is necessary.

But with the facts concerning known ore deposits at hand, an examination of the compositions of the Bactrian coins yields interesting information. In Table VIII are given the ratios of copper to lead, iron and nickel respectively, and the ratio of nickel to cobalt of these coins, as well as of paitung-white copper.

It is immediately obvious that the chemical ratios of the above element in paitung-white copper fall within the range of deviations for the same elements in the cupro-nickel Bactrian coins. The Chinese deposits are therefore a reasonable source for the metal used by the Bactrians for coinage. It remains to be seen whether other sources are as likely.

At the bottom of Table VIII, a high nickel-cobalt ratio of 4 is noted for the ore from Bawdwin, Shan States, Burma as well as the presence of arsenic. This eliminates it as a source. Singhbhum, Bihar, India, is not a possible source because of a low nickel content (Cu/Ni ratio of 19) and the absence of cobalt. For Tobala Taluk, South Travancore, India, it is again another case of a high cobalt ratio (Ni/Co ratio of 8). In addition, molybdenum is present. As to St. John's Island, Red Sea, Egypt, an extremely high iron content (Cu/-Fe ratio much less than 1) as well as the presence of manganese, chromium and platinum disqualify the deposit.

The information on the Jabal al Ma'adan deposit in Wadi Ahin, Oman, where the Sumerian bronzes are surmised to have originated, is very sketchy, but nevertheless this is an unlikely source. It would have been at least equally accessible to Greece as to Bactria, and these countries were in constant

## TABLE VII—KNOWN ORE DEPOSITS OF NICKEL IN CHINA, INDIA, MIDDLE EAST

| Location | Mineral Types | AVAILABLE ANALYSES Ni | Cu | Co | Pb | Fe | As | Sb | Zn | S | Ag | $Al_2O_3$ | CaO | $SiO_2$ | $Fe_2O_3$ | MgO | Estimated Reserves in Tons | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hweili, Sikang Province, China | Pyrrhotite, chalcopyrite and pentlandite occurring in peridotite | 2.63<br>1.02 | 0.64<br>0.54 | | | | | | | 11.45<br>4.78 | | 4.75<br>5.48 | 2.09<br>5.76 | 28.54<br>38.01 | 29.14<br>19.67 | 19.66<br>22.50 | 70,000 | Source of paitung in 17th century (Ref. 26, 27, 28, 29) |
| Tienchuan, Sikang Province, China | Probably as for Hweili. Chalcopyrite, bornite and malachite in vicinity | 1.00 (approx) | | | | | | | | | | | | | | | 270,000 | Started production in 19th century (Ref. 27, 30.1, 30.2, 31) |
| Taoko Shangtung Province, China | Presumably sulphide deposits as for Hweili | 1.20 (approx) | | | | | | | | | | | | | | | | Mined by Japanese, World War II (Ref. 30.4) |
| Weining, Kweichow Province, China | Nickel with bismuth, presumed associated with cobalt ores (0.2-0.3% Ni), Kochiu | | | | | | | | | | | | | | | *Bi* present | | Ore body examined, never mined. Chinese pottery industry used associated cobalt oxide deposits. (Ref. 30.3, 32) |
| Bawdwin, Shan States, Burma | Lead, zinc, silver ores with galena, sphalerite, chalcopyrite, arseno-pyrite (+Co) gersdorffite | 29.72[1]<br>32.88[1]<br>30.02[1] | 6.80<br>9.05<br>8.90 | 7.63<br>3.31<br>6.80 | 3.60<br>2.75 | 4.0/5.0<br>10.25 | 41.60<br>34.76 | 3.50<br>5.00 | trace | 1.10 | 12.20 oz/ton<br>24.40 oz/ton | trace | trace | | | | 24,000,000 | Nickel and cobalt as by-products from arsenical ore (Ref. 33.1, 33.2, 35) |
| Singhbhum, Bihar, India | Chalcopyrite, pyrrhotite, millerite, violerite, pentlandite | | | | | | none | none | | | | | | | | none | | Undoubtedly worked in ancient times. Copper-nickel ratio of 95:5. (Ref. 3.1, 34) |
| Tobala, Taluk, South Travancore, India | Pyrrhotite, pyrite, chalcopyrite, molybdenite | 0.64 | 1.20 | 0.08 | | | | | | | | | | | | *Mo* present | | (Ref. 36) |
| St. John's Island, Red Sea, Egypt | Garnierite, iron oxide, peridotite | 9.48[2]<br>4.86[3] | 0.40<br>0.25 | | | 15.42<br>12.25 | *Pt*<br>pres. | *Mn*<br>pres. | *Cr*<br>0.08 | *Au*<br>pres. | pres. | *Al*<br>4.89 | | *Insol.*<br>50.77<br>39.59 | | | 6,000 | Small quantity exported to France, 1912, 1914. (Ref. 37, 38) |
| Jabal al Ma'adan, Wadi Ahin, Oman | Sulphide ore in thin veins | 0.19 | 1.00 | | | | | | | | | | | | | | | Ore accompanied by slag. Probably worked in ancient times. (Ref. 3.2) |

[1] Bawdwin analyses are for an intermediate product, nickel speiss
[2] Garnierite ore
[3] Iron oxide ore

TABLE VIII

RATIO OF CHEMICAL ELEMENTS IN BACTRIAN COINS AND VARIOUS NICKEL-COPPER ORE DEPOSITS

| *Name of Object* | *Specimen Number* | *Ratio of Elements* | | | | *Remarks* |
|---|---|---|---|---|---|---|
| | | *Cu/Pb* | *Cu/Fe* | *Cu/Ni* | *Ni/Co* | |
| *Bactrian Coins* | | | | | | |
| Euthydemus II | 2A | 14 | 66 | 8 | 20 | Absence |
| Euthydemus II | INB | 13 | 49 | 8 | 16 | of Mo, |
| Pantaleon | 4A | 13 | 55 | 7 | 18 | Mn, Bi, |
| Agathocles | 5A | 9 | 60 | 5 | 20 | Sb, Cr, |
| Agathocles | 6A | 8 | 35 | 5 | 17 | Pt |
| *Paitung-White Copper* | | | | | | |
| Wine Pot Lid | PW | 13 | 46 | 11 | 23 | |
| Ingot—Levol* | .... | .... | 17 | 5 | .... | |
| *Nickel-Copper Ore Deposits* | | | | | | |
| Bawdwin, Shan States, Burma | | .... | .... | 3 | 4 | High As |
| Singhbhum, Bihar, India | | .... | .... | 19 | .... | No Co |
| Tovala, Taluk, S. Travancore, India | | .... | .... | 2 | 8 | Mo present |
| St. John's Island, Red Sea, Egypt | | | | | | |
| Garnierite Ore | | .... | <1 | 1 | .... | Mn, Cr present |
| Iron Oxide | | .... | <1 | 1 | .... | Mn, Pt present |
| Tabal al Ma'adan, Wadi Ahin, Oman | | .... | .... | 5 | .... | |

* — See Table IX for analysis.

communication. No Greek bronze coins have been found to contain more than 0.48% nickel (39), and some of their coinage would have contained more if they had utilized the copper ore from Oman. Another point is that the Sumerians, if it is presumed they had access to this ore, never produced bronzes with more than 4% nickel, whereas the Bactrian coins contain considerably higher amounts.

With the elimination of all of the other known ore deposits from consideration, a logical deduction is that the cupro-nickel Bactrian coins derived from the paitung-white copper ores of China.

### THE METALLURGY OF PAITUNG

Brief discussion of the smelting and refining of paitung will serve to dispel some of the confusion and misinformation which has arisen through the years. According to Tien Kung Kai Mu (40.1) an official Chinese encyclopedia compiled in A.D. 1637, copper ores (and cupro-nickel ores as well) were first washed, then melted in a simple furnace. Molten copper was tapped from the side. If the ore contained silver or lead, two tapholes were used one above the other, and the lead probably carrying the silver tapped first. Thus lead contamination can be expected in Chinese copper or cupro-nickel alloys.

Zinc, however, is not a necessary impurity as commonly supposed. Richtofen (41) describing Chinese practice in 1870 wrote that "white copper" is produced directly from ores in which the various composing metals appear to be always present in little varying composition. Although generally believed to be derived from various provinces, Richtofen positively asserted that at that time Hweili was the only place that it was produced. Coppersmiths in other provinces received it in the form of round or lenticular cakes about seven inches in diameter which were remelted and alloyed with copper, zinc, tin and lead in proportions to suit their purpose. To this circumstance may be ascribed the differences in composition of "white copper" shown by chemical analysis of finished products (Table IX). Copper, nickel, and zinc are usually found as chief constituents; most also contain small quantities of lead, tin and iron. At the time Richtofen wrote, the alloy was used for an infinity of small articles, as water-pipes,

TABLE IX

CHEMICAL COMPOSITIONS REPORTED FOR PAITUNG-WHITE COPPER

| Object | Composition % Ni | Cu | Zn | Fe | Pb | Co | Date A.D. | Reference |
|---|---|---|---|---|---|---|---|---|
| Ingot | 16.0 | 79.4 | .... | 4.6 | .... | .... | 1862 | (42) |
| .... | 15.6 | 40.6 | 43.8 | .... | .... | s | 1776 | (48) |
| Basin | 31.6 | 40.4 | 25.4 | 2.6 | .... | .... | 1882 | (49) |
| Wine Pot Lid | 4.60 | 49.38 | 41.17* | 1.08 | 3.67 | 0.10 | 1955 | Inco |

s — Small amount
* — By difference

tea-pots, plates, candlesticks, incense-basins, and others.

The "white copper" pig or cake as received from Hweili did not contain zinc although it was invariably present in finished articles exported from China. This was shown by Levol (42) in 1862 who analyzed one such pig, donated by the Chinese Ministry of Commerce to the French Conservatory of Arts and Trades, and found it to contain 79.40% copper, 16.02% nickel and 4.58% iron. For reasons of malleability and whitish appearance metallic zinc was added by local coppersmiths during remelting. In fact zinc additions to the "white copper" alloy comprised a comparatively new technique, probably started in the early 17th century during the progressive reign of Emperor Chien Lung in the Ching Dynasty. (See Table IV—17th century mirror.)

Prior to this era, arsenic was added to "white copper" for improving whiteness and hardness; the resulting metal was very brittle. The celebrated Chinese Material Medica (29) of A.D. 1597 mentions clearly copper ore from Yunnan[8] to which arsenic was added. Tien Kung Kai Mu (40.2) says "when copper is mixed with zinc ore, yellow copper (brass) of golden color is obtained; with arsenic, white copper; with tin, green copper (bronze) is produced." There is no mention of metallic zinc additions to white copper although a method of reducing zinc ore (40.1) is well described in the same chapter of the book. Further evidence is found in Sino-Iranica (43.2) by Laufer who stated "paitung-white copper was adopted by the Persians under the name xar-cini in the 11th century A.D. They say the Chinese make this alloy into mirrors and arrowheads; a wound from which is mortal." He also mentioned that Dimasgi wrote in A.D. 1325 that "mirrors of distortion imported from China are made of this alloy, which is hard and fragile. It is injured by fire, after being wrought." Thus all evidence suggests that paitung-white copper of the early days was a cupro-nickel alloy derived from Hweili, to which arsenic was originally added and in which after the 17th century, zinc replaced arsenic as a whitening element, with considerable improvement in malleability.

A puzzling circumstance has been the fact that the ancient Chinese apparently experienced no great difficulty in smelting a nickel-copper sulphide ore to obtain a reasonably refined, malleable, natural alloy, whereas only within the recollection of contemporary men was this feat duplicated with a high nickel-low copper sulphide. In 1905, Robert C. Stanley managed to produce commercially a natural nickel-copper alloy, named Monel Metal, from the sulphide deposits of Sudbury in Canada. Much earlier the middle-Europeans had striven for this goal indirectly in their efforts with kupfer-nickel. Unfortunately they were working with an arsenical ore and the only product resulting was an unworkable metal that had nothing to recommend it commercially.

But the sulphide ores of Canada were not objectionable in this respect and, while it might be pointed out that the commercial goal of their initial exploitation was the production of pure nickel and pure copper, it was nevertheless considered a noteworthy metallurgical feat when Stanley first managed to produce a nickel-copper alloy by direct oxidation of the sulphide and reduction of the resulting compound oxide.

The secret discovered by Stanley was the fact

[8] This refers to the Hweili deposit. Hweili was part of Yunnan Province in the Ming Dynasty (1368-1644) then part of Szechwan in Ching Dynasty (1644-1911), and now part of Sikang Province.

that, in roasting the compound sulphide to remove sulphur, previous investigators had used high temperatures, those normally used for nickel sulphide alone. Since nickel-copper sulphide melts at a temperature below that of nickel sulphide, the matte became fused, the roasting reaction ceased, and the sulphur could not be entirely removed. By roasting initially at relatively low temperatures and slowly increasing the temperature as the reaction proceeded and sulphur was removed, Stanley was able to remove sulphur completely and produce an oxide of nickel and copper which could readily be reduced with carbon and deoxidized with magnesium to make a malleable, well-refined product.

Consider then the ancient Chinese. Their sources of heat were nothing like those of modern man, but only coal or charcoal with bellows for draft. Inevitably, they must have started the roasting process at a relatively low temperature and striven mightily to increase the temperature as their fire quickened to the manipulation of the bellows. Their problem, if any, must have been too little heat rather than too much. And so, much as a canoe glides over shoals which wreck a power cruiser, ancient man never encountered the difficulties which plagued their modern counterparts.

### ANCIENT CHINESE REFERENCES

Additional confirmation of the source of metal for the Bactrian coins is provided by Chinese literature of the period (37.1).

In 140 B.C. an official named Chang Keen was sent by the Han Emperor Wu-Ti from Changan to seek an alliance with a tribe known as the Yue-she, against their common enemy the Heung-noo. Chang Keen reached the court of the Yue-she in about 128 B.C., by a route north of the Himalayas through Chinese Turkestan. The Yue-she, driven from their normal grazing grounds by the Heung-noo, had over-run Bactria (Ta-hea) and smashed the Greek dynasty. Chang Keen found them peacefully settled, with no interest in taking vengeance on the Heung-noo nor in entering into an alliance with China. After more than a year's stay in Bactria Chang Keen returned home, having exhibited remarkable tenacity of purpose to no avail.

In his report to the Emperor (44.1) Chang Keen said "when your servant was among the Ta-hea he observed they had Keang[4] bamboo staves, and Shuh[5] cloth. On inquiring where they procure these things, the Ta-hea people replied: Our merchants go to Shin-tuh (India) to buy them." This confirms, as pointed out by Laufer (43.1) the existence of an ancient trade route running from Szechwan through Yunnan, into northeastern India. From there Chinese merchandise could have reached Bactria. Official communication between the Han kingdom of China and the southwest province of Yunnan was non-existent at that time. Thus by finding the road to Ta-hea (Bactria) the Chinese obtained their first official knowledge of the Tien country (Yunnan) (43.2). The city of Shuh was an iron and copper smelting center at that time and in close proximity to the Hweili cupro-nickel ore deposit, therefore the Bactrian cupro-nickel coins cast some fifty years earlier than Chang Keen's visit could reasonably have been made from the "white copper" pigs of Shuh.

Cammann (53) in a recent article has pointed out the difficulty of travel from Yunnan to northeastern India and suggests that Chang Keen was mistaken in identifying bamboo staves and cloth as of Szechwan origin. If this premise is correct the only alternative is to postulate existence of an ore body with chemical characteristics similar to that of Hweili, but more accessible to Bactria. Available metallurgical evidence makes this alternative extremely unlikely. The difficulty of the terrain may explain why cupro-nickel coins appeared only briefly in Bactria's history and then ceased.

As additional evidence, there is the record (44.3) of Chang Keen's second mission to the Western Regions around 115 B.C., which makes the following statement: "When some deserters from the retinue of a Chinese embassy had settled in Ta-wen (Ferghana) as subjects, they taught the residents how to cast weapons and utensils other than those they already had. Having secured Chinese yellow and white metal the people of Ta-wen (Ferghana) use them for making utensils; they do not use it for money." The term "yellow and white metal" did not mean "gold" and "silver" as interpreted by Hirth (44.3). "Yellow metal" is believed intended for brass (46). "White metal" may have referred either to cupro-nickel or a silver-tin alloy. The latter is hardly likely to have been used for utensils, particularly when referred

[4] Keang is said to be the name of a hill in Szechwan.

[5] Shuh is a city in Szechwan.

to in the same class as brass. Therefore "white copper" seems a more correct interpretation for "white metal" in this instance. Furthermore in other passages the characters for the terms silver, gold and copper were already properly designated as "Yen" (44-4), "Chin" (47) and "Tung" (47) respectively.

These two reports from Chang Keen in 128-115 B.C. give definite information that Bactria was in trade communication with Shuh, near Hweili, by way of India, and that the neighboring country of Ferghana used Chinese white copper for utensils. And the only known artifacts surviving today are a few scattered, exquisitely designed Bactrian coins.

# Appendix: Chemical Analysis by X-ray Fluorescence

BY K. G. CARROLL*

X-ray analysis, because of its non-destructive nature, makes uniquely possible the chemical analysis of any metallic object without damage. In principle the specimen, when suitably excited by an intense incident beam, emits secondary X-rays characteristic of the elements present. These rays are dispersed by means of a diffracting crystal and detected by a Geiger counter with its associated electrical circuits. Analytical results are obtained just as in the more familiar case of optical spectroscopy, the chief differences being that X-rays are more suitable to measure elements of high concentrations, and are limited by instrumental limitations to elements of atomic number greater than titanium.

The measurements reported here were made on a General Electric X-ray spectrometer equipped for analysis of fluorescent X-rays. Excitation was done with a tungsten target tube operated at 50,000 volts, with a bent mica focussing crystal serving as monochromator. Specimens were usually irradiated over an area about three-quarters of an inch square, the effective depth of penetration ranging from a few ten thousandths to a few thousandths of an inch, depending upon the element under analysis. For qualitative work the intensities of the X-ray emission lines were automatically recorded on charts; for quantitative results the X-ray intensities of selected emission lines were measured by timing the accumulation of a fixed number of counts in the scaler. Standards of similar and known composition were run under conditions identical with those for the test specimens, and linear calibration curves used to convert intensity measurements observed for the test specimens into chemical concentrations.

Accuracy of measurement on ancient objects is somewhat influenced by shape factors and the possible occurrence of surface concentration layers caused by processes of corrosion and mineral deposition. Every effort was made to minimize these effects by selection of the location and size of the area of the specimen analyzed.

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# IG II² 43 and Jason of Pherae

A. G. WOODHEAD

Of the many problems in the history of the later 370s which center around the brief career of Jason of Pherae, none has provoked wider discussion than that concerning his relations with the Athenians. It involves two main problems, although the two have not infrequently been confused, and they are certainly interdependent in that an affirmative answer to the second has as a necessary consequence an affirmative answer to the first. Was Jason an ally of the Athenians during some part of his career as leader of Pherae and of Thessaly? And, if so, was he a member of the Second Athenian Confederacy? The evidence for the problem is limited, and hinges on the three passages listed among the *testimonia* below as A, B, and C. Despite some contentions to the contrary, it has become, as it seems, the accepted and orthodox view that Jason was in fact an ally of Athens, although the date and duration of the alliance have been variously assessed. This general acceptance has been to some extent occasioned by the almost universal adoption of the suggestion, put forward in 1891 by E. Fabricius,[1] that the thirteenth name in the additional list of members of the Athenian Confederacy engraved on the narrow side of IG II² 43, which was erased in antiquity, was that of Jason himself. This *rasura* was so effectively made that nothing of the word previously existing can be made out, save that the character of the extreme righthand edge was interpreted by Fabricius as revealing that it once served as the right *hasta* of the *nu* in Jason's name. Other arguments must be based only on the length and position of the *rasura*, and on the fact of its having been made at all.

Since much is made to depend on the epigraphic evidence for Jason's membership of the Confederacy, it is perhaps as well to consider it with some care. To deny its validity is nothing novel, but the subject bears re-examination for two principal reasons; firstly, the voices of the objectors seem to have cried hitherto in the wilderness,[2] and in the second place because their chief arguments lie elsewhere, and their treatment of the stone itself is comparatively cursory. The main reason adduced for the rejection of the inscriptional evidence is the *a priori* one that any argument from what might have stood in a *rasura* is uncertain and cannot fairly be adduced. This amounts to a *non liquet*, which may indeed be the only reasonable judgment to pronounce, since in the last resort none can *certainly* tell whether or no Jason's name might have stood on the stone. But it can be shown with some degree of probability that the likelihood of his inclusion here is small; and it is also possible to suggest that the acceptance of his inclusion would carry with it certain consequences, hitherto insufficiently observed, which reflect on some of the solutions proposed for the chronology of Jason's career in these years.

*Testimonia.* Since the relevant passages are few, it may be helpful to reproduce them at this point.

A. XENOPHON, *Historia Graeca* VI 1, 10. (Polydamas, ruler of Pharsalus in the Spartan interest,

[1] *RhM* 46 (1891) 589/98. Jason's membership in the Confederacy is accepted without question, or with little more than a passing reference in support of Fabricius, by (e.g.) Hicks and Hill, *Greek Historical Inscriptions* (1901) n. 101, Ed. Meyer, *Gesch.d.Alterthums* (1902) V iv, 395/96 § 935, B. Niese, *Hermes* 39 (1904) 110/11 with n. 6, F. H. Marshall, *The Second Athenian Confederacy* (1905) 68/69, E. S. Roberts and E. Gardner, *Introduction to Greek Epigraphy* II (1905) n. 32, W. Dittenberger, *Sylloge*³ n. 147, F. Stählin, *P. W. Realencyclopädie* s.v. Iason, V. Ehrenberg, *Hermes* 64 (1929) 335, A. Momigliano, *Athenaeum* 14 (1936) 6, G. Glotz and R. Cohen, *Histoire grecque* III (1936) 135 with n. 59, H. Bengtson, *Griechische Geschichte* (1950) 257, H. Berve, *Griechische Geschichte* (1952) II, 110. So too, apparently, K. Lemmermann, *Jason von Pherä* (Diss. Jena, 1927), although only the synopsis of this study has been accessible to me.

M. Cary, *CAH* VI 76, speaks of a "short-lived alliance" which he dates to 374—a remark presumably based on *testimonia* B and C. But this seems to be overlooked in the narrative which follows on p. 78.

[2] The three opponents of Fabricius' suggestion have been J. Zingerle, *Eranos Vindobonensis* (1893) 365/71, K. J. Beloch, *Griechische Geschichte* III i, 165 with n. 2 (repeated more or less in the same words III ii, 158), J. Hatzfeld, *REA* 36 (1934) 441/61. Zingerle obtained the opinion of Kubitschek on the stele itself, and Hatzfeld reproduces a short note by P. Roussel. Belloch says that he examined the stone personally.

Hatzfeld's objections (the most recent) are discounted by later writers—explicitly, for example, by Bengtson, *loc.cit.* ("H. jedoch ganz zu Unrecht bestreitet, dass Iasons Name in der Rasur gestanden habe"), and implicitly by M. N. Tod, *Greek Historical Inscriptions* II (1948) no. 123 (esp. p. 67) and S. Accame, *La Lega Ateniese del secolo IV a.C.* (1941) 91. The views of Zingerle and Beloch were similarly rejected by their immediate successors.

reports at Sparta a conversation between himself and Jason, and quotes Jason as follows):

*Καὶ μὴν Βοιωτοί γε καὶ οἱ ἄλλοι πάντες ὅσοι Λακεδαιμονίοις πολεμοῦντες ὑπάρχουσί μοι σύμμαχοι καὶ ἀκολουθεῖν τοίνυν ἀξιοῦσιν ἐμοί, ἂν μόνον ἀπὸ Λακεδαιμονίων ἐλευθερῶ αὐτούς. Καὶ Ἀθηναῖοι δὲ εὖ οἶδ' ὅτι πάντα ποιήσαιεν ἂν ὥστε σύμμαχοι ἡμῖν γένεσθαι· ἀλλ' ἐγὼ οὐκ ἄν μοι δοκῶ πρὸς αὐτοὺς φιλίαν ποιήσασθαι. Νομίζω γὰρ ἔτι ῥᾷον τὴν κατὰ θάλατταν ἢ τὴν κατὰ γῆν ἀρχὴν παραλαβεῖν ἄν.*

B. [DEMOSTHENES] XLIX, 10.

*. . αὐτὸν δὲ τοῦτον [Τιμόθεον] ἐξαιτουμένων τῶν ἐπιτηδείων καὶ οἰκείων αὐτοῦ ἁπάντων, ἔτι δὲ καὶ Ἀλκέτου καὶ Ἰάσονος, συμμάχων ὄντων ὑμῖν, μόλις μὲν ἐπείσθητε ἀφεῖναι, στρατηγοῦντα δὲ αὐτὸν ἐπαύσατε.*

C. IG II² 43; *Syll.*³ 147; M. N. Tod, *Greek Historical Inscriptions* II no. 123, with bibliography.

Lines 97-134.

[Κερκυ]ραίων
[ὁ δ]ῆμος,
[Ἀβδη]ρῖται,
[Θάσι]οι,
[Χαλκι]δῆς
ἀπὸ [Θράικης],
Αἴνιοι,
Σαμοθρᾶικ[ες],
Δικαιοπολῖται,
Ἀκαρνᾶνες,
Κεφαλλήνων
Πρῶννοι,
Ἀλκέτας,
Νεοπτόλεμος,
[Ἰάσω]ν,
Ἄνδριοι,
[Τ]ήνιοι,
[Ἐσ]τιαιῆς,
Μυ[κ]όνιοι,
Ἀντισσαῖοι,
Ἐρέσιοι,
Ἀστραιούσιοι,
Κείων
Ἰουλιῆται,
Καρθαιεῖς,
Κορήσιοι,
Ἐλαιούσιοι,
Ἀμόργιοι,
Σηλυμβριανο[ί],
Σίφνιοι,
Σικινῆται,
Διεῖς
ἀπὸ Θράικης,
Νεοπολῖται,
Ζακυν[θ]ίων
ὁ δῆμος
ὁ ἐν τῶι Νήλλωι.

(Spaces between entries, especially the long *vacat* between lines 130 and 131 have been omitted.)

D. CORNELIUS NEPOS, *Timotheus* IV, 2-3.

Cum Athenis adulescentulus causam diceret, non solum amici privatique hospites ad eum defendendum convenerunt, sed etiam in iis Iason, tyrannus Thessaliae, qui illo tempore fuit omnium potentissimus. Hic cum in patria sine satellitibus se tutum non arbitraretur, Athenas sine ullo praesidio venit tantique hospitem fecit ut mallet ipse capitis periculum adire quam Timotheo de fama dimicanti deesse. Hunc adversus tamen Timotheus postea populi iussu bellum gessit, patriae sanctiora iura quam hospiti esse duxit.

E. POLYAENUS III 9, 40.

*Ἰφικράτης ἐν Θεσσαλίᾳ καὶ Ἰάσων ὁ τύραννος, πλήσιον ποταμοῦ σπείσασθαι βουλόμενοι, δι' ἀγγέλων ἠρεύνησαν ἀλλήλους καὶ τὰ σώματα ἐγύμνωσαν. καὶ οὕτως ὑπὸ τὴν γέφυραν ἐλθόντες διελέξαντο. ἐπεὶ δὲ καὶ τοὺς ὅρκους διὰ τῶν ἱερείων ἐχρῆν ποιήσασθαι, Ἰφικράτης μὲν δὴ ἐπὶ τὴν γέφυραν ἀνῆλθεν, Ἰάσων δὲ τὸ ἱερεῖον παραλαβών, τοῦ ποιμένος ἀπαλλαγέντος, σφαγιάζειν εἰς τὸν ποταμὸν ἤρχετο. καὶ δὴ τότε Ἰφικράτης καθαλόμενος, τῆς σφαγίδος ἐπιλαβόμενος, αὐτὸν μὲν ἀποκτεῖναι ἀπέσχετο, προσομολογῆσαι δὲ ἃ συνέφερεν αὐτῷ κατηνάγκασεν.*

*The literary sources.* The real problem, which the epigraphic evidence has been called in to resolve, is that of the conflict, or apparent conflict, between Xenophon and pseudo-Demosthenes (A and B). Nepos (D) provides some support for B, as does Polyaenus (E), if he is not to be discounted altogether. Thus from B, D, and E it appears that, in the latter part of 373, Jason was an ally of Athens. From A, on the other hand, it seems that in 375 he was not an Athenian ally, and had no intention of becoming one, even though the Athenians would greatly have liked this. The most direct and natural interpretation is that, in the two intervening years, Jason had seen fit to change his mind, and some commentators, notably Hatzfeld,[8] have therefore regarded the conflict of the sources as illusory rather than real. This being the case, the presence or absence of Jason's name on the Confederacy stele is immaterial to the argument, and Hatzfeld is one

[8] *REA loc.cit.* On the epigraphic evidence esp. 442/43, 457. If the evidence of C be accepted, A should precede it in date. If therefore Jason acceded to the Confederacy in 375, Polydamas' speech must be dated to 375 rather than 374 (see Hatzfeld, *loc. cit.* 447, Momigliano, *loc.cit.* 6). Bengtson, and also H. D. Westlake (*Thessaly in the fourth century B.C.*, 1935, 76) explicitly place Polydamas' speech in 374 after Jason's accession to the League in 375, which makes any interpretation of Jason's remark to Polydamas, even that followed by Westlake himself (see below n. 7), extremely awkward. Marshall's dating of the speech in 374 need not be challenged if, as he prefers, Jason's accession to the League did not take place until 373.

of those who in fact reject Fabricius' restoration. But Jason's accession to the Confederacy, as confirmed by the stele, would provide independent testimony that the record of alliance preserved by pseudo-Demosthenes is accurate, and would confirm, on the basis of accepting A and B as they stand, that between 375 and late 373 Pheraean foreign policy underwent some change. Since the change was presumably not so abrupt that, in the same year as his firm statement at Pharsalus, Jason went back on his words and joined the Confederacy, his accession would be more preferably dated to 373, the other year of which the stone appears to permit the choice.

Others have not found such a reconciliation of the literary *testimonia* satisfactory. Apart from the outright rejection of A or B as invalid,[4] various ways around the *impasse* have been attempted. These have principally involved passage A.

(i) It has been proposed that in his remarks to Polydamas Jason was referring not to the circumstances as they were at the time, but to the situation that would arise when his policy had matured, i.e., to some more or less distant future date.[5] This suggestion was effectively rejected by Hatzfeld. It can only with difficulty be extracted from the language Xenophon uses, and is the more unlikely since Jason's purpose is to give Polydamas immediate reasons for action in present circumstances: the urgency is greater than propaganda for a vague if impressive future could warrant.

(ii) It has also been suggested that the speech of Polydamas, and therefore the observation of Jason that he was not at the time an ally of the Athenians, is to be dated not in 375 (or 374) but in 371.[6] If this is so, and if the *rasura* on the stone indicates that the member in question abandoned or was relieved of membership before Leuctra and the defection of Thebes, Euboea, and Acarnania (whose names are not erased), it would be fair to set together *testimonia* C, B, and A (in that chronological order), and to suggest that Jason, a member of the Confederacy in its early years, had ceased to be so by the time that Polydamas went to Sparta in 371. But the arguments for the later date are ingenious rather than convincing, and it is again essential to put Jason's remarks in their context and bear his immediate purpose in mind. In the context of 375, before Jason had become internationally noted and powerful, they fit well. He is, after all, trying to impress—to appear as an important figure, sought after by would-be allies among whom he can pick and choose with *hauteur*, and (as he implies to Polydamas and, through him, to the Spartans) to be feared by would-be enemies.

(iii) A different interpretation of the evidence was put forward by Westlake,[7] which, since Accame failed to take cognizance of it, has not been widely discussed. He evades the problem of Passage A by adopting the solution of Wilcken (no. i above). The validity of C is however crucial for him, since he suggests that Jason's membership of

[4] Passage B was rejected by Beloch: "auch sagt Xen. *Hell.* VI 1, 10, ausdrücklich, dass Iason nicht mit Athen in Bunde stand.... die Rede *g.Tim.* hat dem gegenüber kein Gewicht." *Gr. Gesch.* III i, 165 n. 2. The various solutions proposed have been briefly summarized both by Momigliano, *op.cit.* 6-7, and by Accame, *op.cit.* 92.

[5] U. Wilcken, *Hermes* 59 (1924) 123/24; V. Ehrenberg, *ibid.* 64 (1929) 335; Westlake, *op.cit.* (see below n. 7).

[6] So Beloch, *loc.cit.*, and most recently Accame, *op.cit.* 93/97. Beloch argued that it was impossible to credit that Cleombrotus remained in Phocis with a Peloponnesian army for four years (375/71): Accame does not accept Hatzfeld's attempt to counter Beloch, but neither does he feel that Beloch's case is strong, and his own adherence to the same view is based (*a*) on the terms of the Peace of 375/74 (Isocr. XV 110), (*b*) on such chronological indications as may be derived from the end of Book V and the beginning of Book VI of Xenophon's *Historia Graeca*.

But on neither score do Accame's arguments carry conviction. (*a*) The Peace speedily came to nothing, and it is unlikely that any Spartan withdrawal from Central Greece took place as a result of it. This does not however invalidate Isocrates' neatly chosen phrase, which cannot be dismissed as a *sofisma ridicolo*. (*b*) The chronological indications in the vital section of the *Historia Graeca* do not yield the result Accame suggests. Xenophon related in order the events of 376 and 375, as far as concerned Sparta and Athens, at the end of Book V, picking them up at the beginning of Book VI with a resumptive *μὲν οὖν*. The corresponding *δέ* then picks up Theban activities, contemporaneous with the foregoing, from V 63, and these are followed by a Theban attack on Phocis which must therefore belong to the same year (375). *Σχέδον περὶ τοῦτον τὸν χρόνον* Polydamas goes to Sparta, and here follows a long digression from which Xenophon pulls himself back in VI 1, 19, in order to relate the Peace of 375/74. But *ἐγὼ δὲ πάλιν ἐπάνειμι, ὅθεν εἰς τὰς περὶ Ἰάσονος πράξεις ἐξέβην* carries no connotation of time (i.e., that Xenophon has gone on to recount something occurring later than his previous narrative and must therefore retrace a few years), but merely notes, with a tone of half-apology, that the excursus has been lengthy and that the previous thread of narrative is to be resumed. Nor, in view of the precise reference of this phrase, can the Theban attack on Phocis be included in the excursus, as Accame (p. 98) claims. In fact the whole nexus, digression and all, is firmly set by Xenophon in 375/74, and does not readily lend support to any arbitrary parcelling-around for the convenience of modern theorizing.

Lastly, it may be doubted whether Jason's career of aggrandizement in Thessaly would or could have left the subjugation of Pharsalus to a date as late as 371, and the acceptance of a later dating would react seriously upon the consistency of such accounts of the rise of Jason to Thessalian hegemony as the poverty of the evidence permits.

[7] *op.cit.* 73/76 (cf. 87).

the Confederacy, begun in 375, terminated shortly afterwards in 374, as the result of a kind of gentlemen's agreement. In the negotiations for the Peace of 374, in which the Athenians and their allies were pressing for the autonomy of the dependents of Sparta, Jason found that his ambition for Thessalian hegemony would violate the spirit and the proposed terms of the Peace; it would therefore be advisable in the circumstances, both for him and for Athens, if their formal relations were severed. There were no hard feelings on either side, and passages B and D provide evidence of continuing goodwill. That Jason is then (in 373) described as an Athenian ally is no objection to this interpretation, Westlake claims, since "forensic oratory did not demand a high standard of historical accuracy."[8]

Thus three general lines of argument emerge as possible solutions to this problem, in all of which IG II² 43 has been called in to play a useful, and sometimes a vital, part.

(*a*) To accept A as of 375 (or 374) and B as of 373, with C as support.[9]

(*aa*) As (*a*) above, but rejecting the support of C.

(*b*) To accept A as of 371 and B as of 373, with C as support.[10]

(*bb*) As (*b*) above, but rejecting the support of C, and placing no reliance on B.

(*c*) To accept A as of 375, but denying its validity for the present situation, with the support of B and C.

The denial that support can or should be looked for in C will therefore eliminate all but two of these possibilities (*aa* and *bb*), and it is to the epigraphic evidence taken by itself that we must now turn.

*The narrow side of IG II² 43.* The names listed in the relevant section of C fall into recognizable groups. After the isolated Demos of the Corcyreans comes a list of six communities in the Thraceward area, followed by a group of four all belonging to northwestern Greece and the Ionian islands—the Acarnanians, the people of Pronni on Cephallenia, Alcetas king of the Molossians in Epirus, and his son Neoptolemus. Next comes the *rasura*, and beyond this a list of Aegean islanders, Andros, Tenos, the Histiaeans from Euboea, Myconos, communities from Lesbos and Ceos, and so forth. Unless, therefore, the name which stood in the *rasura* was an isolated name, like that of the Corcyreans in ll.97/98, whose adherence to the Confederacy was unconnected with that of any other city or ruler in the locality, it ought to belong either to the northwestern group which precedes or to the Aegean group which follows. Since Thessaly's maritime connexions, such as they were, were with the Aegean, and more specifically with that region of it which was obviously the next in order to join the League (especially Histiaea), one would expect that Jason, if his name stood here, would belong with the second of the groups in question. The accession of this group is to be connected with the Aegean expedition of Timotheus in 373: a particular friendship existed between Timotheus and Jason (see passages B and D), and in view of the importance of the "capture" of Jason for the Confederacy it would not be surprising if his name were inscribed on the stele as the first of the new members.[11]

It is not however beyond the bounds of possibility that his adherence should be connected with the northwestern group. His relations with Alcetas were close.[12] Timotheus, whose activities in that area brought about the accession also of this group of states, might have used the good offices of the Molossian king to establish contact with, and win the alliance of, his "overlord" Jason. Jason's mem-

[8] Westlake's argument in fact has the effect of straining both major pieces of literary evidence, and of relying for its main support on the (uncertain) testimony of IG II² 43. If the arguments below on the unsoundness of the epigraphic evidence be accepted, his theory, ingenious though it is, can hardly be maintained.

[9] Irrespective of whether Jason's accession to the Confederacy is placed in 373 or an earlier year. But see n. 3 above for the chronology of A and C.

[10] The later dating of A eliminates the necessity for a firm *terminus post quem* for Jason's friendship with Athens. Accame follows Momigliano in thinking that Jason and Athens had been in some sort of collaboration since 377 (Momigliano, *op.cit.* 5, Accame, *op.cit.* 92).

[11] The date of 373 is accepted, among others, by Hatzfeld and Marshall.

[12] Xenophon describes Alcetas as ὑπήκοοι to Jason (*Hist. Graec.* VI 1, 7). But the description is allegedly that of Jason himself, who, as already pointed out, is at some pains to stress the strength of his position. Pseudo-Demosthenes (Passage B) speaks of Ἀλκέτας καὶ Ἰάσων, and, if both joined the Confederacy in 375, the stele also puts the name of Alcetas in front of that of Jason. Too much emphasis should not therefore be laid on the "subjection" of Alcetas (as is done by Accame, *op.cit.* 95/96). It must be admitted that, in view of Jason's character and potentialities, Alcetas rapidly became, or would have become, the junior partner; possibly his ties with Athens were made in order to preserve his independence of status. At any rate it seems clear that as far as the Athenians were concerned both were dynasts of equal standing; whether they spoke of "Alcetas and Jason" or "Jason and Alcetas" was immaterial.

bership of the Confederacy is therefore dated by some to 375 on this supposition.[13] But Westlake is surely right[14] in discounting the likelihood that Iphicrates in 373 was able to cross from the west coast to Thessaly, and it seems equally unlikely that Timotheus, whose financial difficulties in 375 were no less than those of Iphicrates two years later, could extend his operations to a crossing of the mountains and negotiations in Thessaly. Although the attribution of Jason's membership to 375 is commonly made (in spite of Xenophon's evidence), it appears to be less suitable not only to the tone of Passage A but also to the campaigning possibilities open to Timotheus in that year.

The evidence of the *rasura*, on the other hand, leads to the opposite conclusion. The character of the engraving of the names both above and below the erasure is strikingly uniform. Since by common consent some names were listed in 375 and the others in 373,[15] it might be suggested that the same engraver was at work on the two separate occasions. Unless therefore the erased name was an isolated addition made in a completely different hand, the characteristics to be postulated for it should be those, in general, shared by its neighbours.[16] It can however be seen that there are some differences to be detected between the two groups. In the Aegean group the engraver preferred to begin all the names as far to the left as he could, and to preserve a quasi-stoichedon arrangement of the letters. This preference he has abandoned only once—in l.126, where he began the name of the Siphnians with a fairly compressed group of letters, and then gave a wide spacing to the last three letters. This may have been due to his experience with the preceding name, that of the Selymbrians: after ΣΙΦΝ he attempts to resume a stoichedon arrangement *vis-à-vis* the line above, and the final ΙΟΙ is made to correspond with the ΤΜΒ of Σηλυμβριανοί, letters which take up a wide spacing and which had indeed been given too generous an allowance of it, since the end of Σηλυμβριανοί had to be crowded in rather awkwardly.

If Jason joined the Confederacy in 373, which we have suggested as the more probable date historically, and which better suits the geographical considerations of this section of the list, the engraving of his name is likely to have shown characteristics similar to that of the Ceans (l.119), where in fact three of the letters necessary to Jason's name are repeated. From the upright stroke of K to the righthand *hasta* of N in this name the measurement is 0.059 m. Measuring backwards in the *rasura* from the presumed right-hand stroke of the N of ΙΑΣΩΝ, 0.015 m. still remain of the erasure beyond the point at which, supposing the spacing to be that of ΚΕΙΩΝ, we should expect the I of Jason's name to fall. In other words, if the engraver used the same methods with Jason's name as with other names in this section, beginning as far to the left as he could, ΙΑΣΩΝ could have measured as little as 0.059 m. Even with a more generous allowance, as in the first five letters of ΑΝΔΡΙΟΙ (l.112) or ΑΝΤΙΣΣΑΙΟΙ (l.116), each of which contains one *iota* plus four "wide" letters, it remains difficult to fill the 0.076 m. covered by the *rasura*. It seems to follow, as a result, that if the right-hand edge of the *rasura* preserves part of a letter, and if the entry was made in the 373 group, the name to be supplied should have at least six letters and possibly seven (especially if it contained two iotas, for ΕΡΕΣΙΟΙ in l.117 occupies

[13] The date of 375 is preferred, e.g., by Eduard Meyer, Momigliano, Glotz and Cohen, Stähelin, Ehrenberg, Tod, Bengtson, and Accame (for references see note 1).

[14] *op.cit.* 87/88.

[15] Accame (*op.cit.* 86) also ascribes them to the same hand (at the same time?)—"furono dunque registrati di seguito dallo stesso lapicida." Dittenberger (*Syll.*³ 147 n. 42) assigns the second group to 375/74, and connects them with the expedition of Chabrias culminating in the battle of Naxos (cf. Fabricius, *loc. cit.* 590/91). A principal reason for doing so is that the Zacynthians in Nellus, whose name follows at the foot of this side of the stele, were settled in Zacynthus (and presumably enrolled in the Confederacy) in 374, according to Xenophon (*Hist. Graec.* VI 2, 2). This view is followed also by Accame (*op.cit.* 98/102). But the accession of the Zacynthians may not have taken place at once (cf. Marshall, *op.cit.* 66), nor is their position on the stele indicative (*pace* the assertion of Accame, *op.cit.* 86). The name is placed low down on the narrow side, at a distance from the preceding group. Although in its position the last name inscribed on that side, it was not entered at a time when the Athenians could presume that no more members would be forthcoming. And if its addition immediately followed that of the preceding group, it is hard to find an adequate explanation for the intervening *vacat*. Its position is in fact parallel with the first names of members inscribed on the main face, as though the engraver, lacking room to put it on the main face, tried to put it as close to the principal list as he could. This might indeed suggest that its inclusion antedated any names on the narrow side rather than that it postdated them all. The engraving is less well done than in the case of the other names on the narrow side, and seems to bear no relationship to them. All in all, it would be unwise to use this basis for any argument as to the date of the Zacynthian enrollment, either absolutely or relatively to the other members on the narrow side.

[16] Neither Hatzfeld (*loc.cit.* 442) nor Accame (*op.cit.* 91 n. 5) seems to think that the physical measurement of the *rasura* is important. But the difficulty exists and cannot be brushed aside.

almost exactly the space covered by the *rasura* of l.111).

On the other hand, the names in the 375 group are more generously spaced, especially the shorter names such as **AINIOI** or **AAKETAΣ**, in order to give them a better proportion in relation to the longer names of the group, and presumably to give the stele a better appearance in the *ensemble*. In the case of **Σαμοθρᾶικ[ες]** the initial allowance proved too generous. **AINIOI** in l.103 is particularly indicative; from first to last it occupies 0.083 m., even though it contains among its six letters no fewer than three *iotas*. It seems, therefore, that the suggestion that Jason's name was formerly inscribed where the *rasura* now stands would be epigraphically easier to accept provided that it is supposed that it was inscribed with the 375 group rather than at the same time as the names which follow it.

But it may well be doubted whether the supposed right-hand *hasta* of Jason's *nu* provides any basis for argument in the first place. It may be that the workman instructed to erase the name made sure that the job was well done by continuing the erasure some little distance to the right of the last letter; in that case any name of seven letters or less may have stood there, and one may make one's choice. But it is more likely that, to save time and trouble, he worked no farther to the right than was really necessary. Assuming that he was a right-handed man, holding his chisel therefore in his left hand and his mallet in his right, he would in all likelihood begin by inserting the chisel vertically either in a final upright stroke—a point of departure extremely convenient for him—or at the finishing points of such horizontal or oblique strokes as may have completed the last letter of the name (e.g., Σ). From this point he would have worked from right to left, using, we may presume, a chisel of the same width as the tallest upright stroke (i.e., that used for *iota*), making additional strokes at angles other than the vertical when the effectiveness of his erasure demanded it. But whatever the details of his procedure, it may at least be claimed that his point of departure on the right is likely to show, as a fairly firm stroke, something similar to the effect of an *iota*, whether or not that or any other letter in fact had stood in that position. The height of this stroke is 0.011 m., which is the height of the regular full-length strokes in the other names (e.g., in **ΑΝΔΡΙΟΙ** the *iotas* and the left leg of the *nu* have this measurement).[17] *Nu* has on the other hand a short right-hand stroke (0.008 m.), in some cases projecting slightly above the line formed by the tops of the other letters but more usually reaching it and no more. Since the stroke on the right of the *rasura* seems to be one continuous stroke (i.e., it is not, so far as one can tell, a short stroke enlarged subsequently by the eraser and showing traces of reworking), the only alternative to supposing that it has no significance seems to be that of supposing that it was an *iota*: but to adopt either alternative no longer permits us to retain the name of Jason. Thus (*a*) the dimension of the *rasura* indicates that Jason's name, if it stood here at all, should be included with the 375 group, but (*b*) the right-hand stroke, on which Fabricius and others have so greatly relied, seems rather to suggest the improbability of [**Ἰάσω**]*ν* as the proper supplement. The choice remains of substituting in the printed texts either - - - - - ˙ or [- - - -]. It also remains possible to print [**Ἰάσων**], but this would be even more of a hazardous conjecture than was Fabricius' initial suggestion.[18]

*The alliance between Jason and Athens.* It thus becomes possible to return to the problem of the literary sources without the complication introduced by the Confederacy stele, and, as already noted, the most economical as well as the most natural interpretation of the available evidence appears to be that proposed by Hatzfeld. The char-

[17] I am grateful to Mr. H. W. Pleket for rechecking my measurements on the stone.

[18] Its boldness has been somewhat glossed over. Cf. for example B. Niese, *Hermes* 39 (1904) 110/11 n. 6—"Fabricius' Ergänzung ist freilich nur eine Ergänzung, aber. . . ." However, one still cannot say that [**Ἰάσων**] is impossible, and the fact of the *rasura* has yet to be accounted for, which might in itself make some such hypothesis attractive. But there is no guarantee that the erasure took place because of a kind of *damnatio memoriae*. In that case Jason's was not the only, or the most notable, name to require erasure. Further, in Athens the use of erasures for such a purpose is clearly attested in the case of the Macedonian tribes Antigonis and Demetrias at the end of the third century; but it cannot be assumed in dealing with erasures of earlier date, and we may be concerned here with no more than a simple error of misspelling, false inclusion, or mistaken repetition of a name appearing elsewhere. This being so, it is impossible to make any worthwhile suggestion as to what might have stood in this space; my own inclinations are in favor of an island name ending in *iota*, such as **Κύθνιοι**. Those who may still prefer to think of Jason's name for it should at least be clear as to the basis, or lack of basis, which exists for the supposition.

acter of the alliance between Jason and Athens has however yet to be considered. From the parallel case of Amyntas of Macedon it appears that alliance with Athens, even before Leuctra, did not necessarily involve membership of the Athenian Confederacy. The Confederacy was, like the Confederacy of Delos, open to dynasts as well as to *poleis*, and Alcetas and Neoptolemus were, as we have seen, members of it at the same time as they were in alliance with Jason. We should, in view of this, envisage at an early stage two "categories" of allies of Athens, (i) the members of the Confederacy, the "Athenians-and-their-allies," (ii) other allies less closely bound to Athens and her policies, allies of "the-Athenians-and-their-allies." After Leuctra there were apparently no further admissions to category (i): IG II² 43 remained as it was, without additions or subtractions, and all new allies belonged thenceforward to the second class. It must be presumed that the states of the Peloponnese, whom the Athenians attempted to draw into their orbit in 371/70, would also belong to this "second class," and it is therefore incorrect to state that Athens intended to include them in the Confederacy, an essentially maritime organization.[19] Sparta's alliance in 370/69 would also fall into the same class. But the second class may be seen to have existed even while the first was still receiving additions, and may even then have been regarded as particularly suitable for land powers not directly affected by Athenian naval strength, who wished, and were able, to retain a greater measure of independence of Athens. Since Thebes, a land power, was nevertheless a member of the Confederacy at its inception, category (ii) of alliance cannot have existed until the new organization was well started. I suggest therefore that the alliances with Jason and with Amyntas[20] are, for this reason too, better associated with 373 and the activities of Timotheus at that time, and it is possible that this date may have marked the beginning of a new attitude towards the widening of the Confederacy's scope and a greater flexibility in the arrangements for a united front against Sparta, especially since the Peace of 374 had come to nothing. By accommodating those who, while not wishing to join the Confederacy, were not averse to supporting the Confederacy's policy in a general way, the anti-Spartan coalition was greatly strengthened. But the introduction of the looser category of ally may also be regarded as a first step in the conversion of the Second Confederacy into a Second Ἀρχή, a process which, as in the first Athenian League, gathered momentum once the initial *raison d'être* of the Confederacy had disappeared.[21]

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[19] Alcetas (see n. 12 above) was clearly attempting a policy of double insurance—an alliance with Jason safeguarding him from the landward side and another with Athens guaranteeing his coasts. He could hardly fall too much under the control of one ally while he retained the support of the other. Cf. G. N. Cross, *Epirus* (1932) 33/35, P. R. Franke, *Alt-Epirus und das Königtum der Molosser* (1955) 22/23.

Accame quotes no alliances of Athens with Greek cities other than within the Confederacy earlier than 362, but the new system is certainly visible immediately after Leuctra. On Athens' relations with the Peloponnesian states in 371/70 see M. Sordi, *Riv di Fil* NS 29 (1951) 34/64.

[20] IG II² 102, M. N. Tod, *Greek Historical Inscriptions* II no. 129 with bibliography. See Accame, *op.cit.* 165/66.

[21] This article was written in the course of a year spent as a member of the Institute for Advanced Study, Princeton, New Jersey. It is a pleasure to record here my gratitude to the Institute for its generous hospitality, as well as to Professors W. Den Boer, B. D. Meritt, and A. E. Raubitschek, and to Messrs. W. A. Camps and G. T. Griffith, who read the manuscript in the course of its development and greatly improved it by their advice and criticism.

# News Letter from Rome[1]

A. W. VAN BUREN

PLATES 105-114

The unusual amount, and the sustained interest, of archaeological information from Italy during the twelve months under review (down to May 1957), are due in part to the extensive reclamation of hitherto waste land for agricultural and industrial purposes, the increasing participation of foreign institutions in archaeological projects, and the application of the most recently perfected techniques, such as air-photography, boring, and also, when practical, periscopic photography.

For the city of ROME,[2] an outstanding event was the meeting of the *Sodalizio fra Studiosi dell' Arte* on the morning of Sunday, Feb. 10, 1957, when the advance sheets of the new edition of the Severan marble plan of Rome, *Forma Urbis*,[3] were exhibited by the able group of collaborators, Antonio Maria Colini, Guglielmo Gatti, Luca Cozza, and Giovan Filippo Carettoni, who for some years have been engaged in its preparation. Embodying as it does the noteworthy results of their labors, which have included a painstaking survey of the brick-faced wall against which the slabs of the plan were originally affixed, and placing at the disposal of scholars full information as to this unique official document—the fragments of which have undergone various vicissitudes since most of them were discovered in Renaissance times—this publication will form an essential element in future study of the city of Rome.

In the Roman Forum and on the Palatine, the program of investigations which was described in previous reports has been carried forward with definite results: the excavation in the zone of the *Niger Lapis* has been enlarged to the east and northeast of that monument, that is to say in the part of the Republican Comitium which had been partially explored by Boni in 1900. After scientific excavation, this general area is to be systematized, protected and rendered accessible to the public.

At the meeting on June 6, 1957, of the Accademia Pontificia di Archeologia, Dr. Maria Floriani Squarciapino showed and discussed slides of a number of recently discovered fragments, from the Temple of Divus Iulius, of the frieze which bore figures of divinities set in the midst of foliage.

In the atrium of Santa Maria Antiqua, the rapidly deteriorating wall-painting showing Pope Hadrian has been detached with the collaboration of the Istituto Centrale del Restauro.

On the Palatine, the excavation of the zone to the southwest of the House of Livia has led to the discovery of the remains of a Republican house, broken into by Imperial foundations. It has proved possible to recover considerable fragments of the wall-decoration, and to restore their pattern in its essential features. It was of an architectural nature—the Second Pompeian Style—similar to that of the Casa dei Grifi, and there were pavements of *lithostroton*. The construction is attributable to the first half of the first century B.C.

In the southeast sector of the Palatine, the "emperor's box" of the so-called stadium of Domitian has been undergoing restoration, with the strengthening of the upper and lower annular vaultings; while on the eastern slopes of the hill, the entrance-gate of the former "Orti Farnesiani" has been reassembled, to serve as the new monumental entrance to the excavations.

A special feature of last year's report[4] consisted of an account of the newly-discovered catacombs near the Via Latina. An authoritative preliminary description of this important development by the Reverend Father A. Ferrua, S.J., has now appeared.[5] A large proportion of the wall-paintings reveal affinities with the reliefs on sarcophagi, an indication of comparatively late date. The generosity of Father Ferrua now renders it possible to supplement our previous description by illustrations of

[1] The most recent installment of these reports appeared in *AJA* 60 (1956) 389-400, pls. 128-35.

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[2] *AJA* 60 (1956) 389-90.

[3] Published by the Commune of Rome.

[4] *AJA* 60 (1956) *loc.cit.*

[5] *La Civiltà Cattolica* (1956:2) 118-31.

three of the more remarkable pictures which are either unique or extremely rare. Plate 105, fig. 1, the representation of the story of Samson and the Lion (*Judges* XIV, 5-18), shows two phases of the adventure: in the second phase, a swarm of bees are already buzzing about the dead body of the beast, a perfect instance of what the art-historians have been calling "the continuous style."

Plate 105, fig. 2, the meeting of Christ and the Samaritan Woman[6] (*St. John* IV, 5-30), is represented at least once elsewhere, in the Catacombs of Callistus;[7] but, quite apart from the solemnity of the lesson conveyed, the present representation is archaeologically interesting for the exact depiction of the method of drawing water.[8]

Plate 105, fig. 3, the third scene, appears to represent a demonstration in anatomy. The central figure, larger in proportion than the others, is obviously the chief personage, but the actual demonstration is being performed with a rod by one of the other men of the group. It has been suggested that the principal figure was an eminent professor of anatomy who had been buried in these catacombs.

The unexpected happened on the fourteenth of July 1956 when some miscalculation in regulating the sluices along the upper course of the Tiber resulted in the bed of that river being left dry for a number of hours. In the stretch extending upstream from Ponte Cavour, the course of the river had shifted since antiquity: hence the receding waters revealed a city street flanked by houses: their walls are described as intact up to a height of some two feet, and mosaic pavements and other details are mentioned as being in a good state of preservation. It is improbable that these remains will be seen again in our time.

The Roman papers report that the vast clearing undertakings in preparation for the new first-class airport at Fiumicino have revealed considerable remains of the harbor of Claudius.

The investigation, on the part of the archaeological service of the Commune of Rome, of the villas flanking the Via Severiana in the area of ancient Laurentum,[9] has revealed further details of a villa which had been partially uncovered some years ago. Pending further information and more detailed study, it seems well to suspend judgment as to the possibility of this having been the villa of Pliny the Younger so attractively described by its owner in *Ep.* 2.17.

Two years ago,[10] reference was made to Professor Antonio Radmilli's extremely important investigations and discoveries of remains of the Upper Palaeolithic Age in the Grotta Polesini at Ponte Lucano below Tivoli. It is understood that these have since continued satisfactorily along the lines there described.

The popular press has conveyed from time to time a certain idea of the nature and development of the vast undertaking at Pompeii.[11] In particular, it has shown pictures of the cement cast of a man who, while trying to escape from the catastrophe, met his death by asphyxiation in the rain of fine ashes, and also the stone statue of a gladiator in armor. The kindness of Commendatore Maiuri now enables us to show (pl. 106, fig. 4) the recently discovered city gate through which the highway passed which led towards Nuceria; a view (pl. 106, fig. 5) of that highway after its swerving to the left, the east, outside the gate, including the series of burial monuments with which its southern side was lined; and (pl. 106, fig. 6) a closer view of three such monuments on the opposite side of the road, revealing something of the varied architectural and decorative features of such structures. In some instances the cream-colored stucco surfaces are covered with painted notices, pencilled remarks and graffiti, either inscriptions or sketches, many of them referring to the gladiators who must have formed a familiar feature of the scene along this much frequented thoroughfare, which led in the general direction of the amphitheater.

The sumptuous Roman villa of Minori on the Amalfi coast has been mentioned repeatedly in former reports.[12] The masses of detritus which overwhelmed it in 1954 have now for the greater part been removed; and in order to protect it from similar floods in the future, radical measures have

[6] Observe the "Oriental" eyes!

[7] W. Lowrie, *Monuments of the Early Church*, 225, fig. 72.

[8] For the well with its shaft capped by a curb "made from the upper part of a large terracotta storage jar," compare *The Athenian Agora, A Guide to the Excavations* (1954) 93. For the rope wound about a windlass, see *PW.*, *s.v. Wasserleitungen*, col. 476.

[9] *AJA* 53 (1949) 378; 59 (1955) 304.

[10] *AJA* 59 (1955) 313-14.

[11] It may not as yet have become a matter of common knowledge among specialists in the study of Pompeii and Herculaneum, that the celebrated *crux* in Pliny, *Ep.* 6.16.8, has now been settled (Rudolf Hanslik, in *JOAIBeibl* 16 [1954] 159): the husband of Rectina was Cn. Pedius Cascus, consul suffectus in A.D. 71 (*CIL* XVI 14-17).

[12] *AJA* 58 (1954) 325; 59 (1955) 305.

been adopted to shift the course of the torrent which was directly responsible for the recent disaster. In the course of this undertaking, the workmen came upon the remains, poorly preserved and threatening collapse, of at least two edifices. Our pl. 106, fig. 7, shows part of a room in one of these, as it appeared while being cleared, before the Administration proceeded to the necessary task of detaching the wall-surfaces and transporting them to the offices at the main villa. These walls are decorated in the Third Pompeian Style; in the dado of each section an iris plant is represented; in the upper panel, on a white ground, tragic masks, vases and birds. Another edifice includes what appears to have been a semi-subterranean nymphaeum; this building likewise contained Third Style wall-paintings which had to be detached and installed in safer quarters. Evidence has accumulated that the Roman villas of this coast were buried in the eruption of Vesuvius of A.D. 79 beneath the ejecta which had been carried by currents of air and deposited upon the mountainside, and eventually were washed down by torrential rains.

The investigations conducted by the Museo Provinciale of Salerno (Director, Professor Venturino Panebianco) which were mentioned in last year's report,[13] have developed most satisfactorily. The acropolis of the Etrusco-Campanian community at Fratte di Salerno has yielded sufficient fragments of the terracotta revetments of a temple to justify the reconstruction of its essential elements: pl. 107, fig. 8, shows one type of terracotta cornice decorated in relief; pl. 107, fig. 9, a second, more ornate and very unusual type in which the lower band is not executed in relief but is painted; pl. 107, fig. 10 shows one of the antefixes adorned with female heads wearing remarkable headdresses; pl. 107, fig. 11, the end of the sheathing of the ridge-beam, including the disk which overhung the pediment, and the top surface for setting in place the statue which stood above the apex of the roof; finally, in pl. 107, fig. 12, the same disk is seen from the front, with its representation in relief of Herakles contending with the Nemean Lion. The period is Early Hellenistic, the culture Samnite following upon the colonizing of this area by that people.

The same period and culture are represented by the necropolis situated at the foot of the eastern slopes of the acropolis: it consists of monumental tombs, both chambers and burials *a cassa*. The former reproduce the features of a rectangular house with gable roof; they are hewn out of the native tufa rock, but have their walls constructed of squared tufa blocks and faced with stucco. The bodies of the men had bronze belts, the women were provided with clay vases. Our pl. 108, fig. 13 showing the equipment of one of these tombs reveals the various influences which converged in this community, especially those derived from the centers of Magna Graecia and Apulia.

The news from the interior, the Valley of the Tanager, maintains its interest. At Sala Consilina, the extension of the investigations in the zone of the archaic necropolis, upon the mountainside below the present town of Sala Consilina, the methodical undertaking of which was assumed the previous year by the Administration of the Museo Provinciale of Salerno, has led to a clearer definition of that necropolis. In the first place, this has been revealed as being distinct from the burial-ground where in 1896 the first discoveries occurred of objects which are now in the Petit Palais in Paris, and is also distinct from another burial-ground, which has now been identified still further towards the north and is soon to be explored.

Up to the Spring of 1957, 502 burials had been found, all of the type "*a pietre*" and with rich burial equipment.

The chief novelty has consisted in the finding of the earliest "Oenotrio-Ausonian" tombs, with characteristic equipment consisting of *impasto* wares. This equipment in part appears to show the continuation and development in the Iron Age of the antecedent "Oenotrian" culture of the Bronze Age (Pertosa type);[14] it preserves features already familiar from the Prehellenic cemeteries of Taranto, Matera, Cumae, etc., but more frequently embodies transformations due to archaic Eastern-Greek influence, especially in the systems of decoration, which appear capable of explanation only on the supposition of the arrival, at a time between the close of the eighth century B.C. and the beginning of the seventh, of fresh populations, the bearers of the so-called "Villanovan" culture.

Such tombs of the earliest "Oenotrio-Ausonian" culture, observing the rite of cremation, are followed, in the same burial-areas as the preceding "urn-fields," by the more numerous tombs of the Orientalizing Ionic phase and of the archaic period (7th-5th centuries B.C.), with equipment of the

[13] *AJA* 60 (1956) 392-93.

[14] See Ebert, *RLV*, II, 372; VI, 93.

type already known, conspicuous among which are vases which show a striking polychrome decoration of geometric style (pl. 108, fig. 14).

As Professor Panebianco observes, we thus have, at last, the first complete and organic archaeological documentation of the function fulfilled by the Valley of the Tanager in the Early Iron Age, not merely as an inland route of the commercial transportation conducted by Sybaris between the Ionic and the Tyrrhenian seas, as had hitherto been generally assumed, but as a self-contained organism of supply and demand, frequented by populations which for the greater part came from Metapontum and the Siritis. The valley maintained commercial relations with the Achaean colonies of the Ionian sea, by way of the caravan routes starting from the opposite valley of the Akiris (mod. Agri), or else with the Ionic-Chalcidian colonies of the lower Tyrrhenian sea, along the valley of the river Pyxous (Buxentum), at the mouth of which, as is well known, lay the commercial port of the same name.

Further investigations at the bottom of the valley, about half-way between Atena Lucana and Sala Consilina, but in an area belonging to the latter community, have led to the discovery, in a zone recently reclaimed for cultivation, of some characteristic antefixes, with busts of Maenads and Sileni, which perhaps belonged to the roofs of burial shrines of the Hellenistic Period; these constitute direct evidence for the knowledge and the study of the art of the Lucanian interior, which clearly was destined to remain under the influence of Graeco-Italiote culture down to the definitive arrival of Rome, in the second century B.C.

The excavations in progress at Padula (anc. Consilinum) have not only yielded further Graeco-Italiote burials in the zone to the northeast of the present town, with abundant equipment in the form of choice objects and vessels of bronze and b. f. and r. f. Greek wares, as well as other tombs of the Lucanian necropolis of the Hellenistic period; but they have also led to the discovery, in the zone directly to the north of the great Certosa, of a monumental group of edifices, still in course of excavation in the Spring of 1957, which is perhaps to be assigned to a Hellenistic-Roman Asklepieion. This must have been both a sanctuary and a sanitarium, as appears from certain therapeutic installations, which were found together with a votive altar bearing a dedicatory inscription to Aesculapius, fragments of stelai, and, a still more interesting find, a torso of a marble statue (pl. 109, fig. 15), possibly representing in the guise of a youth the divinity worshipped in the sanctuary.

At the lower end of the valley, there came to light the remains of a villa of Roman imperial date, which had been transformed into a Palaeochristian basilica.

At Paestum,[15] Professor Sestieri has completed the clearing of the area of late Roman houses lying between the Forum and the Temple of Athena (of "Ceres"), with results which appear in pl. 108, fig. 16. Near the impluvium of one of the houses a curious object came to light (pl. 109, fig. 17): a statuette of a Triton in Luna marble, less a copy than a reworking or adaptation of Hellenistic originals.

In the western part of the city, in the zone to the west of the street which skirts the temenos of Hera, some mediaeval lime-kilns bear testimony to the fate which awaited most of the marble statuary of Paestum. Near one of these, evidently overlooked by chance, was an admirable female head of Luna marble (pl. 109, fig. 18), obviously intended for insertion in a statue. It is the portrait head of a girl, crowned with an oak(?)-wreath and wearing a veil, suitable attributes for a member of the Julio-Claudian House. The protruding eyes and the sensitively modelled mouth, very similar to those of portraits of Tiberius, likewise show that she belongs to that imperial family; the hair-dress too resembles that of the portraits of Octavia and Livia in the Louvre.[16]

At Velia,[17] the foundations of the temple which surmounted the acropolis have now been completely uncovered (pl. 110, fig. 19). Various portions of the Ionic moulding which formed the bottom course of the cella wall have been found, but no trace of the upper parts or of the columns.

At the eastern end of the acropolis, near the 12th century Church of St. Quirinus, now serving as a farmhouse, a stretch of pseudo-isodomic wall of sandstone blocks has come to light, which surely belonged to the temenos of the sanctuary of the acropolis (pl. 110, fig. 20). Within this, upon a series of blocks, the settings can be seen for four circular bases, one of which has been found (pl. 110, fig. 21). This is a cylindrical base of marble

[15] *AJA* 60 (1956) 391-92.
[16] Bernoulli II, i, figs. 16, 10, 12.
[17] *AJA* 57 (1953) 214-15; 58 (1954) 326; 59 (1955) 307; Sestieri in *Archaeology*, Spring 1957, 2-10.

(ht. m. 0.45; diam. m. 0.70), having on its top surface the attachments, with remains of iron pins, of the feet of a statue with its left leg advanced, and bearing on one side a bilingual (Greek and Latin) inscription indited by the *Senatus et Populus Veliensis* in honor of a certain C. Iulius Naso. It is datable in the first century of our era.

Moreover, near the southeast extremity of the acropolis a curious terracotta antefix has been found (pl. 110, fig. 22), a rare variety datable in the sixth century B.C. The ceramic finds were few, the most notable one being an eye-kylix.

Finally, a sounding to the west of the temple has disclosed a stretch of wall executed in the most refined polygonal technique, which may well have belonged to a primitive temple erected in the period of the Phocaean foundation of the city (Hdt. 1. 167; Strabo 6.1.1.), (pl. 110, fig. 23).

The wind-swept promontory of Palinurus was mentioned in previous reports,[18] describing Sestieri's exploration of the burial area which implied the presence of a settlement in the neighborhood. The German Archaeological Institute in Rome has now undertaken a fuller examination of the site. Its initial campaign, conducted by the second director, Professor Rudolf Naumann, and Professor Bernhard Neutsch, cleared a number of houses on the acropolis and a stretch of some 300 feet of the city wall, built of sandstone and limestone. Over thirty graves of the necropolis were examined: their repertory comprised clay vases, bronze and iron fibulae, weapons and ornaments. The vases included a few imported archaic Greek products with b. f. decoration of the end of the sixth century B.C., but consisted chiefly of indigenous ceramics, predominantly following Greek models. Finds of Greek terracottas and tile-stamps, as well as Greek and Late Roman coins, testified to a long span of existence of the community. The finds have been installed in the recently established Antiquarium of Palinuro.

Important news from the southeast corner of the Italian peninsula has been generously communicated by Dr. Nevio Degrassi, Soprintendente for Puglia and the Materano (Museo Nazionale, Taranto). At Manduria (Prov. of Taranto), excavations have been conducted for several years past with the view of freeing the great circuit of walls which extends for several kilometers about the present town. Three rings of "megalithic" walls have thus been identified, the latest and best-preserved of which—a structure of huge blocks, more than five meters thick and at some points over six meters high, with spacious exterior moat—is dated in the third century B.C. by some burials which have been found beneath the wall itself (pl. 111, figs. 24, 25). The vast necropolis extending outside the walls has been excavated in part. It yielded in particular an abundance of "Gnathia" ware and of the indigenous vases of the *trozzella* type. Some ancient gates also have been identified and cleared, belonging both to the most recent circuit and to the more ancient ones.

In 1956, at Canosa di Puglia (anc. Canusium), at the locality S. Aloia near the railway station, a remarkable underground burial-place has been discovered, consisting of four rooms disposed in the form of a cross. It had already been visited by tomb-robbers, but they had left a number of clay stoppers for large vessels, as well as fragments of terracotta statuettes and tiny bits of gold and ivory.

The architecture and art of this underground edifice assign it a place among the monuments of Canosa between the beginning and the middle of the third century B.C. Its façade still preserves a painting executed in red and brown on a white ground (pl. 111, fig. 26): two draped women in solemn attitudes preceded by a man on horseback—only the hind parts of the horse have survived.

Canosa has also yielded an establishment for the decantation of liquids, with its various parts well preserved—a succession of intercommunicating tanks, leading to a large leaden jar, a terracotta pipe, and at the end of the series a spacious conical tank.

In 1956, excavations at Canne (anc. Cannae, which gave the name to the great battle) uncovered the entire circuit of the walls together with its single gate (as appears), facing east. The walls are of various dates, from the fourth century B.C. down to Late Mediaeval times. Stratigraphic soundings in the vicinity of the gate and along the interior and exterior faces of the walls yielded numerous sherds which proved of interest for the study of the local products of the fourth and third centuries B.C.

Before following the west coastal areas of the peninsula northwards from Rome, we turn to the mountainous interior, the territory of the Aequi

[18] *AJA* 60 (1956) 392; and earlier reports there cited (note 15).

and Marsi, where the important Roman military colony of Alba Fucens has been the scene of a series of campaigns undertaken by the Belgian Academy in Rome.[19] The cumulative results of these were brilliantly presented by Professor Fernand de Fisscher in an illustrated lecture at that institution on Feb. 14, 1957. Within the already known circuit of walls, the town-plan with its streets has been recovered, and the central area excavated, with a basilica, a bath edifice, a theater, and various shops and houses, some of the latter possessing well preserved mosaic pavements. The yield of artistically outstanding marble statuary has been remarkable. The chronological span extends from the founding of the colony in 303 B.C. to the latter part of the fourth century of our era and even later. Alba Fucens has thus acquired a position of distinction on the archaeological map of Italy.

Important developments in Southern Etruria now demand consideration. At San Giovenale, near Blera, excavations were conducted in the Autumn of 1956 by the Soprintendenza for Southern Etruria and the Swedish Archaeological Institute in Rome.[20] As was the case with the Cortuosa and Contenebra mentioned by Livy, 6.4.8-11, the fortunes of this outlying community seem to have been affected by the wars between Tarquinii and Rome. To judge from the tombs up to now explored, the town belonged culturally to Caere, since almost every detail reveals a strong influence from this large neighboring city.

The acropolis is surrounded by ravines and steep hillsides. The main axis runs from East to West for some 500 meters. Here only a preliminary exploration has been made. The hillsides had been in places reinforced by walls of ashlar. In the eastern area remains of houses and two wine-presses came to light and a well was cleared to a depth of 12.60 m., yielding finds from the fifth and fourth centuries B.C.

To the west of the mediaeval castle which dominates the acropolis, there extends a rock-cut *fossa*, re-used in mediaeval times. On the surface outside this *fossa* abundant sherds indicate that the site had been inhabited as early as the Villanovan period. The main part of the present campaign, however, has been devoted to one of the extensive cemeteries which surround the town on the somewhat lower plateaus at its north, east and south sides. Two Villanovan *pozzi* and fifteen Etruscan tombs have been explored. One of the former was intact and contained a large biconical ossuary, fragments of a shallow bowl of black *impasto*, which served as a lid, and two smaller vases of the same type as the ossuary. The *pozzo* was covered by a mighty lid of tufa in the form of a shield.

The chamber tombs yielded black and grey bucchero, Corinthian and Attic b. f. vases together with Etruscan imitations of the same wares, and the usual red fluted dolia, also a quantity of coarse household utensils. One of the more remarkable finds is an admirable but fragmentary neck-amphora: its better preserved side represents the contest of Herakles and Apollo for the Delphic tripod.

Not a single r. f. sherd was found: hence the area of the necropolis explored up to the present antedates 520 B.C. The tombs had been rifled, but in addition to the rich yield of pottery the architectural details proved interesting. The oldest tomb was a structure in tufa ashlar. The chamber originally contained only one couch: subsequently a second one, of a different material, was inserted opposite this. The other tombs, entirely rock-cut, are of two types, the most interesting of them resembling the Regulini-Galassi tomb at Caere, with an open "central nave," the couches being disposed in the "aisles" protected by the sloping roof of the tomb. Above the open middle part of the roof were laid transverse slabs of tufa. In one exceptional case the roof construction was entirely preserved.

Nine tombs of this type were explored. The chamber tombs of the other type, known from Caere, six of which were excavated, yielded the same kinds of pottery as those just mentioned. The largest one consists of two chambers. The front wall of the inner room had its door and two windows framed *all'egiziana*. Traces of wall-decoration with incised outlines are still discernible. The tombs had been originally covered by mounds as at Caere.

The vicinity of Cervetri and Tarquinia, with its infinity of Etruscan chamber tombs, has proved peculiarly adapted to the application on a large scale, by the Fondazione Lerici with the cooperation of Mr. John Bradford, of a combination of techniques: air-photography, electrical-resistivity survey, drilling, and the use of the "periscope-tube"; finally,

[19] *AJA* 53 (1949) 379; 56 (1952) 134.

[20] Information kindly supplied by Professor Axel Boëthius.

in case the photographic information thus obtained warrants it, the actual excavation.[21]

Meanwhile, the chance find at Santa Severa, the ancient PYRGI, one of the ports of Caere, of some architectural terracottas, and a terracotta head from a statue, implies the presence of a temple and has suggested the advisability of official excavations at that spot.

Professor Jean Bayet, Director of the French School of Rome, kindly informs us as to the current undertakings of that institution. The discovery in 1955, on the slopes of La Capriola, near La Cività, some four kilometers to the south of BOLSENA, of an important "Villanovan" cemetery,[22] induced M. R. Bloch to continue his investigations—of already three years' duration—in this sector. Was the hill of La Capriola about to reveal the "Villanovan" settlement which preceded the Etruscan community of La Cività?

The exploration of La Capriola revealed several portions of a circuit of wall scarped vertically out of the native rock with the addition of some blocks of stone at the top, as appears in our pl. 112, fig. 27. There is no reason for asserting that this circuit belongs to the "Villanovan" period. In reality, the summit of the hill contains a group of *fondi di capanne* (pl. 112, fig. 28) of various forms, but especially ovoid, hollowed out of the rock or consisting of pavements of small pebbles. And these vestiges were accompanied by sherds of *impasto*, extremely coarse, entirely hand-made, with very simple decoration, whether incised (parallel or intersecting lines, series of dots), or in relief (ridges sometimes crossing at a right angle) (pl. 112, fig. 29). This ware, as Professor Bayet informs us, corresponds to that of several groups preserved at the Museo Pigorini in Rome, and belongs to the "Apennine Culture of the Bronze Age," an agricultural phase which up to the present had been recognized chiefly in the Center and the South of the peninsula, but only a very few inhabited settlements of which had been found.

The importance of this discovery, Professor Bayet observes, is increased still further by the fact that the two neighboring hills and the depression between them now present us with a succession of sites: a settlement of the close of the Bronze Age (10th and 9th centuries B.C.), a late "Villanovan" population (first quarter of the 7th century), and finally an Archaic Etruscan community (La Cività) and tombs (6th and 5th centuries). This is a combination extremely rare in Tuscany, and one that lends itself to the most fruitful investigations.

Apart from this, M. Bloch, having learned of certain chance discoveries which had occurred to the north of Bolsena, undertook the systematic exploration of this sector, thus saving it from clandestine depredations. At a place called La Pantanesca, about half-way between Bolsena and the necropolis (6th-5th centuries B.C.) of Barano, some chamber tombs were discovered, already violated, but still containing an important repertory of small bronzes (winged genii serving as feet of cistae) and of vases of the Hellenistic Period (silvered relief ceramics of the fabric of Vulsinii). All this, as well as a stone sarcophagus lid bearing carved on one of its sides a facing female head (Gorgon?), dates from the second century B.C. The homogeneity of this material and the chronological limits within which it belongs impart a special interest of its own to this "occasional" excavation, which has contributed such a degree of precision to knowledge of the topographical distribution of the burial areas about Bolsena.

At the meeting of the Accademia Pontificia on June 6, 1957, Professor Renato Bartoccini, Soprintendente for Southern Etruria, gave an account of the results achieved in the first campaign, at the close of 1956, of the official excavation of VULCI: this promising undertaking has already yielded paved roads, late Etruscan portrait sculptures, and some quite detailed models of temples.

The Soprintendente for Etruria, Professor Giacomo Caputo, kindly informs us from Florence of the systematic continuance of that Soprintendenza's activities along the lines previously reported; an outstanding event has been Dr. De Agostino's finding at Populonia of a complete *cassone* burial—a sarcophagus 2.20 m. long, constructed of squared stone slabs joined by mortising and covered by two blocks set so as to form a peak midway between the two ends. The scanty fragments of bone which it contained indicated an individual of over thirty years of age; and the burial equipment consisted of

[21] A clear account of this revolutionary method, which has already yielded amazing results, was presented by Mr. Bradford in *ILN*, no. 6147, March 30, 1957, pp. 506-07.

[22] For these sites: *AJA* 58 (1954) 327-28; 59 (1955) 307; 60 (1956) 395.

60 pieces, arranged at the feet of the deceased with the exception of an ointment-vessel and a bowl which had been placed at the level of the shoulders. The items comprised painted vases of Etruscan fabric, including characteristic oinochoai, two perfect specimens of which appear in our pl. 112, fig. 39, black-glaze and plain clay wares, various leaden objects such as a plate, a hook, a strainer, a bucket; also the fragments of two candelabra. All this material is datable in the fourth-third centuries B.C.

Near BAGNI DI ROSELLE (Prov. of Grosseto) three large fragments of an archaic Etruscan stele have been found, showing in high relief a figure of a warrior together with the final letters of the inscription with the name of the deceased. On the hill of Roselle itself there has been found by chance the statue of a sphinx, in marble, of uncertain date.

At GARAVICCHIO (Prov. of Orbetello), in the Spring of 1956, a small necropolis was found, of an early period. The tombs (*a forno*) were often preceded by a short dromos and had the door closed by a large stone slab or by stones placed one upon another; they contained skeletons in the typical position with knees bent, together with ceramics, stone artifacts and objects of bronze. Some tombs had served for successive burials.

At AREZZO, on the summit of the hill, a start has been made with the exploration of some remains of Late Etruscan structures, characterized by the use of large blocks of stone set without mortar. The material observed in the excavated earth would date these remains not earlier than the third century B.C.

The developments at SPINA[23] continue to be sensational. Among the numerous ceramic finds from the various sepulchral areas an outstanding item has been a large r. f. Athenian kylix by the Penthesilea Painter[24] which has been provisionally assembled from a number of fragments: the tondo shows two ephebes before an altar, the enclosing frieze the chief labors of Theseus; the exterior presents two scenes of struggle between heroes.[25] Meanwhile, air photography has revealed not only the ancient system of canals in this swampy area but the actual site and the general plan of a city,[26] if not the Greek Spina itself, then—and with greater probability in view of its situation beside the main canal, the extensive area covered, and also the apparently substantial character of the structures—the *Portus Vatrenus* of Pliny, *N.H.* 3.119, 120.

Well preserved remains of an extensive pile-settlement of the Late Bronze Age have been discovered on an islet in the River Mincio, and then, after careful recording, were destroyed in connection with the regulation of the bed of that stream. A far earlier pile-settlement in the Lago di Varese is at present being investigated.[27]

Dr. Nino Lamboglia, of the Istituto Internazionale di Studi Liguri, reports an important development at the present VADO LIGURE: here some building operations have made it possible to conduct a stratigraphic excavation on a large scale; this has revealed an apparently outlying portion of the Roman Vada Sabatia, with structures extending in date from the last years of the second century B.C. down to the close of antiquity, and including two houses of the traditional Republican and Augustan type with atrium.

Turning now to Sicily, and first to a site on its northern coast:

Dr. Carettoni has continued his excavations of HALAESA (Gr. Alaisa), near the present Tusa,[28] with excellent results. A general survey of the city area has led to the identification of the course of the principal street (cardo), six meters broad, which climbed from the southwest gate to the quarter of the Agora. The position of the Agora itself has also been identified and a stretch of the portico flanking it on the west has been brought to light (pl. 111, fig. 30). In the central quarter of the city an edifice has been uncovered, perhaps a bath, with basins and a room paved in mosaic, also a peristyle with finely wrought columns.

The numerous trenches which have been opened in the interior of the city have revealed other zones of private residences, with secondary streets leading to the cardo.

Finally, on the northern crest of the hill of Halaesa, the foundation of a temple has been identified. By reason of its situation and size, Dr. Carettoni considers that it is probably to be attributed to the tutelary divinity of the city. The foundation of a second temple (?), of the Hellenistic period, included, like the first, within the circuit of the walls, is situated to the east of the former.

[23] *AJA* 60 (1956) 396.
[24] J. D. Beazley, *Attic Red-figure Vase-painters* (1942) 581-89, 962.
[25] *ILN*, no. 6135, Jan. 5, 1957, p. 37.
[26] *Le Vie d'Italia*, Febr. 1957, 160-69.
[27] *op.cit.* April 1957, 489-96.
[28] *AJA* 57 (1953) 217; 59 (1955) 309.

In the course of this campaign, an abundance of ceramic and architectural material was obtained.

At Megara Hyblaea,[29] MM. Vallet and Villard, for the French School of Rome, renewed at the usual dates, in two campaigns (April-May and September, 1956), the excavations under their direction.

The programme envisaged the clearing of a fresh sector of the Hellenistic circuit, on the west side, starting from the central gate and working towards the north. The flanking tower, symmetrical with that already known to the south, has been uncovered and has shown itself to be similar to its fellow, its interior being divided into four rooms. A drain cut in the rock discharged the water from the street onto which the gate opened. The wall is well preserved, up to a height of two meters, towards the north. Its clearing has established a fixed point in the chronology. In fact, all the neighborhood of the wall was covered with houses of the second century before our era, dated with certainty by potsherds and coins, to the exclusion of any later edifices. Thus the hypothesis that this fortification was razed by Marcellus has acquired a high degree of probability.

A second group of workmen cleared the northwest angle of the fortress: a *redan* flanked to its northeast by a square tower. But the part that swerved back towards the east and the sea had collapsed over the cliffside, or else had been intentionally dismantled. At this point a huge lime-kiln has been found to have continued in use down to the close of the seventeenth century. However, it has been discovered that on its northern front the Hellenistic fortification had re-used a stretch of the archaic circuit, in all respects resembling the remains which Cavallari and Orsi had uncovered in the year 1889:[30] three courses of large blocks form an effective facing, set against a bank of stones heaped together at random. The most recent sherds found in the foundation trench date from the close of the sixth century B.C. This circuit, then, slightly antedated the destruction of the city by Gelo and the Syracusans.

Among the fillings of the wall and of the Hellenistic houses, mention must be made of a fine fragment of the angle of a cornice with an Ionic frieze, and a funeral cippus of the third century B.C. naming one Demetrios, son of Kephisodoros, an Athenian. The foundation trench of the northern portion of the archaic wall has yielded the fragments of a large r.f. cup of Severe Style attributable to the Epeleios Painter (towards 510).[31]

The Soprintendente for Eastern Sicily, Professor Bernabò-Brea, in agreement with MM. Vallet and Villard, has undertaken to clear the structures of the Hellenistic fortress, by demolishing the dwellings of the second century, with the exception of a building containing some well-preserved wine-presses; the excavated area has been widened on both sides of the wall, the foundations of which have been strengthened. The long eastern side was to be attacked in 1957.

The space within this fortress has now been expropriated: an area of fourteen hectares will thus be reserved for the scientific investigation of the earliest Greek settlement and of the enclosed Hellenistic city which succeeded it in the fourth and third centuries before our era.

At Ragusa, the ancient Heraian Hybla, Dr. Antonino Di Vitá has continued his exploration of the necropolis in the Contrada Rito which was mentioned in last year's report.[32] During April-May, 1956, on the slopes of the plateau which faces the Siculan fortress, 75 tombs were uncovered. They fall into the following types: 42 depositions in the bare earth; 19 *casse*, formed, in general, of large rectangular slabs (pl. 112, fig. 31); 3 monolithic sarcophagi, and 3 in two sections; 5 "*enchytrismoi*"; one *cameretta*; one olla with incinerated remains, protected by terracotta slabs set *a capuccina*. The earth burials were in large part covered with flakes of rock, but not infrequently also with slabs of soft limestone or with large blocks. The *cameretta* had its covering supported lengthwise by a wooden beam. As a rule, each tomb contained a single body, but in a few instances the burials were two, and in rare cases, perhaps even three to a tomb.

The funerary repertory was abundant: it consisted principally of Late-Corinthian and b.f. Attic wares. There were numerous vases of daily use, without decoration, also an abundance of Siculan amphorae and oinochoai, of local make. Among the most conspicuous pieces must be mentioned a splendid "Siana" cup,[33] which has been reconstructed from two fragments. There are numerous silver spiral earrings and finger rings, two of which bear

[29] *AJA* 57 (1953) 217; 58 (1954) 330; 59 (1955) 309-10; 60 (1956) 397-98.
[30] *MonAnt* I (1890) cols. 726-42; pl. II.
[31] Beazley, *op.cit.* 107-11, 951.
[32] *AJA* 60 (1956) 398.
[33] Beazley, *Attic Black-figure Vase-painters*, 51-74.

engraved bezels. Terracottas are present. It is a necropolis which for types of burial and for inventory is certainly Greek, and the surviving tombs which have so far been explored are datable roughly between the middle and the end of the sixth century B.C. Only the one burial *a capuccina* appears to be several decades later; this however cannot have been a unique instance, since not far from it, in making the cut for the road that led to the discovery of the necropolis, many r.f. fragments were found of the Severe Style, with which it has proved possible to reconstruct a large krater and a kylix.

Attention had been directed[34] to a fortified site, CASTIGLIONE, which extends along a narrow plateau on the summit of an outlying ridge of the Heraian Mountains enclosing the present Comiso on its north. A portion of the neighboring necropolis had been explored in the year 1951 by A. Di Vita.[35] Its graves proved to contain indigenous wares of local fabric, importations from other Siciliote centers, and Greek, almost exclusively Corinthian, importations giving a date ca. 550 B.C. For this site, the identification had been proposed with the Kasmene or -nai of Hdt. 7.155.2 and Thuc. 6.5.2, with Steph. Byz. Hence, in June 1956 Dr. Di Vita conducted a brief campaign of excavation which showed that the place contained an inhabited settlement, of which however only the foundations of the dwellings, or the traces of them in the rock, survive. This has been explored for a space of ca. 125 meters E.-W. and 25 m. N.-S., and at several points has revealed two phases, the first of which appears to terminate within the sixth century B.C. with a destruction in the last decades of that century, while the second phase is attested down to the fourth century B.C. Minor finds were scanty, owing to the slight depth of the earth covering; but they included a female bust of the late sixth century B.C. Of the necropolis of the archaic phase, on the eastern slopes of the hill, four more small rock-cut chamber tombs have been found, of the same type as those explored there in 1951.

Two years ago,[36] a brief account was presented of the far-reaching undertaking at Gela and in its back-country, with which the Soprintendenza for Agrigento and Caltanissetta had entrusted Drs. Dinu Adamesteanu and Piero Orlandini.[37] In the interim, the development of this programme has maintained its interest.

At GELA itself, upon the north side of the acropolis, a short distance to the east of the Museum, a series of terraces has come to light containing private houses and shops, datable between 339 and ca. 310 B.C., the Age of Timoleon and the following years. The walls of the buildings were constructed in part of re-used architectural members from the edifices which had been destroyed by the Carthaginians in 405 B.C. This fourth-century stratum rested upon the foundations of *thesauroi* of the sixth and fifth centuries; these archaic edifices, in their turn, lay above the prehistoric stratum of the First Siculan Period. The Timoleontean level has yielded a great quantity of statuettes (pl. 113, fig. 32), vases, and some important moulds. In the stratum antecedent to the year 405, an important part was played by the architectural terracottas, especially antefixes (pl. 113, fig. 33), and a large votive deposit of statuettes (pl. 113, fig. 34).

Near the railway station, there has been the accidental discovery of what appears to be the largest coin hoard as yet unearthed in Sicily: 927 coins were recovered, didrachms and tetradrachms of Gela, Agrigentum, Syracuse, Messana, Acanthus,

[34] M. Nicosia Margani, *Casmene ritrovata?* (Comiso 1955).
[35] *NS* 1951, 335-60.
[36] *AJA* 59 (1955) 310-12.
[37] Their publications have kept pace with the progress of their investigations. To the previous bibliography (*ibid.* 310, note 29) the following items have been added: D. Adamesteanu, "I primi documenti epigrafici paleocristiani nel retroterra di Gela," *RendLinc* 10 (1955) 562-71; "Le fortificazioni ad aggere nella Sicilia centro-meridionale," *RendLinc* 11 (1956) 1-15; "'ANAKTOPA o sacelli?" *ArchCl* 7 (1955) 179-86; "Vaso figurato paleocristiano dal retroterra di Gela," *Boll. d'Arte* 2 (1956) 158-61; "M. Saraceno ed il problema della penetrazione rodio-cretese nella Sicilia meridionale," *ArchCl* 8 (1956) 121-46; "Nouvelles fouilles à Géla et dans l'arrière-pays," *RA* 8 (1957) 20-46 (to be continued); "New Light on Classic Greek Military Architecture: the Great Wall of Gela and the Other Discoveries at the ancient Greek Colony in Sicily," *ILN* vol. 230 (1957) 153-55. P. Orlandini, "Nuovi graffiti dagli scavi di Gela," *RM* 63 (1956) 140-54; "Piccoli bronzi raffiguranti animali rinvenuti a Gela e Butera," *ArchCl* 8 (1956) 1-10; "Altre antefisse sileniche di Gela," *ArchCl* 8 (1956) to appear.

In the press: "Tipologia e cronologia del materiale archeologico di Gela dalla nuova colonizzazione di Timoleonte all' età di Ierone II," *ArchCl* 9 (1957) fasc. 1; "Nuovi acroteri a forma di cavallo e cavaliere dall' acropoli di Gela," in the volume in memory of Guido Libertini. In the meantime, the first group of reports on the excavations at Gela, prepared by D. Adamesteanu and P. Orlandini, has appeared in *NS* 10 (1956) 203-401; and Dr. Adamesteanu is seeing through the press the reports on "Manfria, Butera e Fontana Calda" (*MonAnt*) and "Milingiana, Suor Marchesa, Priorato, Gibil-Gabib, Lavanca Nera" (*NS*).

Here—in order to present a fairly proportioned account of the results accomplished—it will be necessary to résumé a few of the contents of these articles: but in general it is our purpose to communicate either unpublished or little known items.

and Athens, all of them in an excellent state of preservation and datable between the close of the sixth century and the year 480 B.C. The same zone proved to contain a number of small *naiskoi*, evidently associated with one of the many little extra-urban sanctuaries; the architectural material included a grandiose pedimental antefix representing a Gorgoneion.

Building operations in the city area have revealed various wells and cisterns; one of these latter, of the time of Timoleon, proved to contain large fragments of the border of its aperture, which was decorated with masks of Sileni and Gorgons; it has thus been possible to reconstruct the entire border. On the Via Crispi, another sector of the necropolis has come to light; the material yielded by the fourteen tombs which have been excavated included a large Etruscan bucchero kantharos. On the Piano Notaro, remains of a Greek habitation of between 310 and 282 B.C. were found to contain statuettes of the Tanagra class, coins, a Tarentine antefix with the so-called "Artemis Bendis," and in particular a small terracotta altar datable in the second half of the sixth century B.C. and exhibiting in high relief the myth of Herakles and the giant Alkyoneus. At Capo Soprano, the excavation and restoration of the Greek fortifications, familiar from previous reports,[38] has been completed, and fresh discoveries have permitted a shifting of the date of (the first period of?) these walls to the second half of the fourth century B.C.

The concomitant investigations in the back-country of Gela have fully demonstrated the existence of a number of fortified indigenous sites—*φρούρια*, Diod. 11.91.3—and their early penetration by Greek influence, after which they deserved the name of *πόλεις* (Diod. 16.73.2). After the fruitful campaigns at Monte Desusino and Butera,[39] attention was focussed on MONTE BUBBONIA. Here the new, methodical excavations have quite altered the conception of the place and its culture which had been derived from Orsi's brief campaigns.[40] There proved to be an extensive circuit of wall with *agger*, enclosing a considerable settlement, of the Archaic Period; the edifice upon the summit was a *thesauros*, as is shown by the Gorgon antefixes there found.[41] Two kilns for baking terracottas rested against the town wall, one of them preserving its contents still in place; and the equipment of graves likewise lying just outside the circuit (pl. 113, fig. 35) confirmed the archaic date of the wall. It was during that period also that the local production of a fine quality of vase began (pl. 114, fig. 36). This then was an indigenous center, which under Greek influence eventually developed into a true *πόλις*, though still retaining some of the local traditions. The later vicissitudes of the place reflected those of Gela herself: the disaster of 405 B.C. at the hands of the invading Carthaginians, the revival stimulated by Timoleon about 340 B.C. (Diod. 16.73.2), then a gradual decline.

A similar settlement is GIBIL-GABIB, some 10 km. to the northeast of Caltanissetta. It occupied the site of a prehistoric hut-village, and its archaic fortification wall was strengthened in the fourth century B.C. Another archaic fortified center has been identified at MONTE SABUCCINA some 10 km. to the southeast of Caltanissetta.

One of the most flourishing of these settlements was that at VASSALLAGGI, and this extended over five hills between San Cataldo and Serradifalco. This too possessed a defensive *agger*, datable in the first half of the sixth century B.C. The hills had previously been occupied by an indigenous population of the phase of Castelluccio.[42] The burials in the necropolis, which is characterized by the use in general of sarcophagi of alabastrine gypsum, but occasionally of *pithoi* or of graves *a cappuccina*, range from the mid-fifth to the close of the fourth century B.C.; the co-existence of indigenous and Greek cultural traditions appears clearly in our two illustrations, pl. 114, figs. 37, 38.[43]

A similar course of development has been traced by means of the campaigns of excavation to the west of Gela, at MONTE SARACENO near Ravenusa, inland from Licata—this possessed at least two temples and two *thesauroi*—and at two sites deep in the interior of the island: TERRAVECCHIA and COZZO MUSUCINO; at all these places Greek culture had penetrated as early as the sixth century B.C.

Further, the daily press[44] reports the investigation, by the Soprintendenza for the Provinces of Agrigento and Caltanissetta, of still another early site at the locality "ROCCA DI RAFFE" near the new

[38] *AJA* 53 (1949) 386-87, pl. 53 C-E; 59 (1955) 311-12.
[39] *AJA* 59 (1955) 312.
[40] *NS* (1905) 447-49; (1907) 497-98.
[41] *RendLinc* (1956) 363.
[42] First Siculan Period, Cuprolithic: *RLV* XV, p. 82, Register s.v.; B. Pace, *Arte e Civiltà della Sicilia Antica*, IV, index, s.v.
[43] The "Nolan" neck-amphora belongs with those attributed to the Painter of Munich 2335 (Beazley, *Red-figure*, 779-83).
[44] *Il Tempo del Lunedì* of Rome, July 9, 1956.

highway between Mussomeli and Bompensiere, not far from Caltanissetta: a hill-fortress defended by three concentric lines of wall extending in horseshoe shape about three sides of the place, while the fourth, southern, front was adequately protected by the precipitous drop of the hillside. Here again, evidence as to the local culture and dating is afforded by a neighboring cemetery: a Siculan community, dating from the beginning of the seventh century B.C., became penetrated by Greek influence.

Even when presented in this compressed form—dictated by considerations of available space—the significance of this carefully conceived and systematically executed programme of investigation of Gela and its back-country will be apparent: it initiates a new phase in the knowledge of the cultural history of this island, "the meeting-place of the nations."

ROME

# BOOK REVIEWS

RADIOCARBON DATING by *Willard F. Libby*. Second edition. Pp. ix+175, with 11 figs. in text. Chicago, The University of Chicago Press, 1955. $4.50.

A uniquely useful contribution made by the physical sciences to archaeology is the now well known method of dating certain organic remains by the radiocarbon process, known more familiarly as Carbon 14. This extensively revised edition of the basic introduction to the method is certain to become a standard reference work for the archaeologist and prehistorian, and Dr. Willard F. Libby of the Atomic Energy Commission and his publishers are to be thanked for making a second edition possible. Like the first edition, the revision includes chapters describing the principles of the method, the world-wide distribution of radiocarbon, the nature of the half-life of radiocarbon, the preparation of the sample for measurement, and the measurement of the sample. Two appendices list the special equipment and chemicals for the $C^{14}$ sample preparation apparatus and the special materials for a screen-wall counter.

The major chapter of interest to the reviewer, and the only one which has been appreciably revised or extended, is that on radiocarbon dates. In Section I, Mesopotamia and Western Asia, sixteen new samples have been added, six from Egypt, one from the Sudan, six from Iraq, one from Palestine, one from Afghanistan, and one from the Lebanon. Section II, Western Europe, has been extended by the addition of five samples, two from Ireland and three from the Netherlands. Section III, the United States and Canada, has appropriately received the largest number of new tests, numbering just over a hundred. Section IV, Mexico and Central America, has two new Mexican samples described, as well as seven new Central American samples. No samples from Central America were included in the first edition. Section V, South America, has unfortunately only one new testing, and this from a context examined earlier. Under the heading of Other Areas, twenty-two new samples have been analyzed; they are distributed as follows: seventeen from Africa, two from the Far East, two from Hawaii, and one from the Marianas Islands.

This formidable amount of material has been studied by Frederick Johnson in a chapter entitled "Reflections upon the Significance of Radiocarbon Dates," which replaces his similar contribution to the first edition, "The Significance of the Dates for Archaeology and Geology." Johnson's perceptive evaluation of this mass of material stresses a feature which must be constantly borne in mind: the value of a sample depends largely upon its correct labelling, its conservation, and the lack of contamination. A particularly valuable discussion is Johnson's examination of the cases of untenable dates and the reasons for the curious results of these tests.

Since the beginning of the application of the method, other, and to some extent rival, scientific techniques have been proposed, but it is doubtful whether as large a number of samples has been examined by these methods. The availability of these techniques, which could not have been foreseen a generation ago, imposes on every field archaeologist the task of obtaining, whenever possible, suitable samples, and the proper preservation of the specimen until it reaches the laboratory. It imposes an even greater task on the historian, who must utilize the results with utmost caution and, one hopes, with a measure of common sense.

WILLIAM KELLY SIMPSON

NEW YORK

LIBYCA: ANTHROPOLOGIE—ARCHÉOLOGIE PRÉHISTORIQUES, Tome I—Janvier 1953. Pp. 229, numerous plates and figures. Bulletin du Service des Antiquités, Direction de l'Intérieur et des Beaux-Arts. Gouvernement Général de l'Algérie, Algiers, 1953. 550 French Francs.

This new quarterly bulletin of the "Service des Antiquités du Gouvernement Général de l'Algérie" has most gracefully been given the same title as a work of Juba II, the cultivated king of Mauretania. It will be devoted to North African archaeology of all periods and divided into two distinct series: prehistoric archaeology and anthropology; and classical archaeology and epigraphy.

The first and third numbers in any year (January and July) will constitute the prehistoric series, edited by M. Lionel Balout, Director of the Laboratory of Anthropology of the Bardo Museum in Algiers. It replaces and continues the work of the "Travaux du Laboratoire d'Anthropologie et d'Archéologie Préhistoriques du Musée du Bardo," I-V, and will cover the Palaeolithic, Neolithic, and other prehistoric periods of all of North Africa. This prehistoric series (in brown covers) takes as its field not only Morocco, Algeria, Tunisia, Libya and their southern territories, but also the Saharan Desert regions of Spanish Sahara, French West Africa, Fezzan-Tibesti, and the Libyan Desert to the very Nile, as well as the French Sudanese areas of Senegal, French Guinea, Ivory Coast, Niger, Tchad and French Equatorial Africa.

It is a large order, but this first number and the four in the brown series which have since appeared, roughly every six months for 1953, 1954 and 1955-1st. semester, are an invaluable and most impressive cumulative research record. This first number, although happening to report mostly Algerian material, is a good representative cross-section of the sort of mate-

rial to be expected: (1) a short résumé of the Pleistocene geological, palaeontological and Palaeolithic archaeological sequence in two key Moroccan sites at Casablanca and Rabat, fundamental for these periods, this region and beyond (G. Lecointre); (2) a review of ten significant, now mostly destroyed, Palaeolithic sites in the western suburbs of Algiers, giving history, present state, excavation results, status of collections and bibliography for each (G. Souville); (3) reports on two Middle Palaeolithic (Mousterian, Aterian) sites in Algeria (P. Cadenat, H. Hugot), on three Upper Palaeolithic (Capsian, Iberomaurusian) sites in Algeria (J. Morel, R. Le Du, E. Sérée de Roch) and a detailed physical anthropological analysis of a skull from one of the latter (L. C. Briggs); (4) observations on certain Algerian Neolithic rock paintings and engravings of animals with arguments for recognizing certain domesticated forms therein (G. Esperandieu); and (5) a chronicle covering bibliography for 1952 on prehistory in the Maghreb, Sahara and Sudan under headings: Periodicals; Bibliographies; History and Research; Prehistory and Geology; Palaeontology (floral and faunal); Palaeoclimate; and Prehistory of Morocco, Algeria, Tunisia, Sahara and Sudan. The corresponding chronicle in the second (July) number of this series each year is to contain a survey of field work and research in progress for these regions. All in all, this new periodical provides a most valuable check list of publications and an important, although far from the only, channel for publication of site reports and research on this special field and area.

The second and fourth numbers of "Libyca" in any year (April and October) will constitute the classical archaeology and epigraphy series (in green covers), edited by M. Marcel Leglay of the University of Algiers. It will cover the Classical, Christian and Libyco-Punic periods of Algeria alone, since Tunisia, Morocco and other countries have their own publications for these periods. It is a new and welcome outlet for a backlog of North African data formerly largely channelled through the "Bulletin archéologique du Comité des Travaux historiques du Ministère de l'Education nationale" in Paris. Its general policy will be to confine itself to the purely documentary facts of excavations, epigraphy and texts and to avoid theory or general history, covered in the *Revue Africaine* and elsewhere. Numbers for 1953, 1954 and 1955-1st semester have already appeared.

Bruce Howe

PEABODY MUSEUM, CAMBRIDGE, MASS.

Die Jungfernhöhle bei Tiefenellern. Eine neolithische Kultstätte auf dem fränkischen Jura bei Bamberg. By *Otto Kunkel*. Pp. 138, pls., figs., tables, maps. C. H. Beck'sche Verlagsbuchhandlung, Munich 1955.

This monograph deals with the excavations carried out in the Jungfernhöhle, a cave near Tiefenellern in Franconia (Bavaria). It covers the archaeological remains, the folklore connected with the cave and the surrounding area, the fauna, the results obtained through the application of the phosphate method to the cave deposits, and the physical anthropology of the human remains unearthed. Also, there is a discussion of the materials recovered from a nearby open-air Neolithic settlement.

Actually the Jungfernhöhle was never occupied; its function appears to have been more in the nature of a refuse pit. The cave consists of a more or less vertical shaft in the mountain side, near the ceiling of which there is a relatively small aperture which forms the cave entrance. The archaeological materials range from the Neolithic period to the early 19th century A.D.; the post-Neolithic remains are, however, of little consequence. The bulk of the Neolithic remains consists of considerable quantities of Danubian *Bandkeramik*; in addition Michelsberg, Rössen and Corded Ware pottery was found. The remainder of the archaeological inventory of the Neolithic phase includes shoelast celts, worked flints, shell, bone, and antler objects. Of interest is a Mediterranean shell (*Glycemeris glycemeris L.*), which attests the widespread trade connections of the Neolithic inhabitants of this region.

The author's thesis is that the cave was the center of a Neolithic cannibalistic cult. This thesis is based on the nature of the human remains found in the Neolithic levels. These consist of the incomplete remains of 38 individuals, mostly females, including 29 children and adolescents. The skeletal remains are associated with *Bandkeramik*, but they do not appear to represent burials. The skulls and long bones show obvious signs of deliberate smashing and breaking, the nature of which strongly suggests cannibalism. In the case of all the skulls where identification was possible, the occiput was badly smashed. Moreover the canines and incisor teeth had been removed from all the upper and lower jaws either shortly before or immediately after death. The haphazard distribution of the human remains in the cave suggests that the bodies were dismembered outside and the separate parts subsequently thrown into the cave-shaft. The physical anthropological evidence indicates that the bones did not belong to the *Bandkeramik* people. There is nothing to show that here the skeletal remains represent secondary burials of the *Bandkeramik* folk, which might have explained the association of the bones with the pottery, and our present knowledge of the burial customs of the *Bandkeramik* people certainly contradicts such a theory. Therefore Kunkel suggests that a cannibalistic sacrificial cult was practiced here by the *Bandkeramik* people. The author believes that the victims may have been the remnants of a pre-Danubian Mesolithic population that was still surviving in the region during the period in question. Furthermore, Kunkel correlates the Jungfernhöhle, and the cult practiced here, with the nearby *Bandkeramik* settlement discussed in one of the chapters of this monograph.

The present reviewer cannot agree with the lengthy intercontinental ethnological comparisons and speculations which the author propounds in the last chapter of this study. Very useful, however, is the impressive section listing and discussing other known cases of cannibalism and human sacrifice in prehistoric Europe (pp. 116-23). This well-illustrated study is a very interesting and useful contribution to the literature on the Neolithic of Central Europe. It materially adds to our knowledge of the distribution of *Bandkeramik* in Southern Germany, and it throws most interesting light on what appear to be certain cult practices of the Neolithic period.

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PLEISTOCENE STUDIES IN THE MALAPRABHA BASIN by *R. V. Joshi*. The Deccan College Research Institute and the Karnatak University Publication No. 1. Pp. 116, pls.; figs.; tables; maps. Poona-Dharwar, 1955.

This publication deals with the Lower Palaeolithic industry and associated geochronological problems of the Malaprabha River basin located in the Karnatak region of Southwestern India. The first section of the monograph is devoted to a discussion of geological and environmental features of the region. Included here are the results obtained through sedimentary analysis, as well as a conjectural reconstruction of the Pleistocene climate. The second section deals with the Palaeolithic materials from various localities in the area, and their place in the general setting of other Indian and extra-Indian Lower Palaeolithic complexes.

The results of the author's geochronological studies show a succession of three deposits of Pleistocene age covered by a recent "cotton soil." Climatologically these are correlated as follows:

| | |
|---|---|
| Cotton soil | Present Climate |
| Brown Fluviatile Sands | Dry Climate |
| Cemented Old Gravels with Artifacts | Wet Climate |
| Mottled Clays | Dry Climate |

This sequence overlies a laterite (?) of pre-Pleistocene age which is tentatively correlated with a humid phase. Only the Cemented Old Gravels are implementiferous. The author notes the absence of fauna remains. He does not attempt to date the geological sequence. On the basis of the stone industry, he suggests a Middle or Upper Pleistocene age for the Cemented Old Gravels.

The tools, recovered from 19 sites, consist of hand-axes of Abbevillian and Acheulian type, cleavers, choppers and chopping-tools on pebbles, and flake tools. The flake tools are most common, and among them flakes with prepared striking platforms are rare. Most of the tools are fresh, but rolled and weathered specimens also occur. On typological grounds the author ventures to assign his industry to the Late Acheulian. On the whole it seems to bear little similarity to the assemblages from Northwestern India. A limited comparison is possible with the Lower Palaeolithic materials from the Narbada Valley and the Mayurbhanj region. On the other hand, the Malaprabha artifacts are almost identical with those of the Madras, Godavari and Gujerat industries. In view of the basic similarity revealed by the Lower Palaeolithic hand-axe complexes wherever they occur, the author's lengthy comparison of his material with African and European hand-axe assemblages does not appear, to the present reviewer, either enlightening or particularly relevant. Also it is felt that a certain amount of terminological confusion in Joshi's tool classification could have been avoided. This applies particularly to the definitions of *choppers* and *chopping-tools*, which the author calls *scrapers* and *choppers* respectively.

On the whole this well-illustrated monograph is an interesting and valuable contribution to our knowledge of the Lower Palaeolithic of India.

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NEUE DENKMÄLER ANTIKER TOREUTIK, by *Bedřich Svoboda* and *Dimiter Končev*. Monumenta Archaeologica. Acta Praehistorica et Historica Instituti Archaeologici Academiae Scientiarum Bohemoslovenicae Curante Jaroslavo Böhm Edita, Tomus IV. Pp. 172, figs. 46, pls. 32. Prague, 1956.

An important publication easily overlooked is *Neue Denkmäler antiker Toreutik*, two separate monographs in German (Czech résumés) bound under a single cover.

Svoboda's ambitious contribution, entitled "Zur Geschichte des Rhytons," uses a silver rhyton acquired thirty years ago by the National Museum of Prague but never previously published (thereby qualifying as "neues Denkmal") as the point of departure for an impressive list of rhyta and representations of rhyta from Minoan prehistory down to the fourth century B.C. Unfortunately, the list is scattered through the text, and there is no index. Thus the value of this book as a supplement to Buschor's excellent study on rhyta (*MJb* 11 [1919-1920] 1ff) is considerably impaired.

A preliminary excursus on the proper use of the term "rhyton" concludes with a definition that will, it is hoped, lead to a standardization of usage and preclude the future random application of the name to mugs, statuette vases, plastic lekythoi, oliphants, and the like. A rhyton, we are told, must exhibit two simple characteristics: to curve and to be open at both ends. Most metal rhyta, of which increasing numbers are being found, conform to this definition. Most pottery specimens do not.

Next follows a lengthy section dealing with rhyta and related vessels in the Aegean and the Near East. Their development is offered as the historic back-

ground without which the Prague rhyton cannot be properly understood. We are told that Cretans transformed early Near Eastern askoid vessels and then transmitted the resultant developed theriomorphic forms back to the Near East where they were imitated in the native wares. Rhyta proper, according to Svoboda, began in Iran, were imitated by the Hittites, Chaldeans, and Syrians, and were ultimately refined by the metalsmiths of the Achemenids, who for the first time distinguished between animal-head vessels and rhyta terminating in animal protomes. Both types were subsequently adopted by the Greeks who saw the Persian booty on the Acropolis after the defeat of Xerxes I. This is stating the matter very simply. In *Neue Denkmäler* it takes one hundred pages and two hundred and ninety footnotes. Whereas the really important problem of Cretan cult connections is lightly passed over, much importance is given to the ritual significance of rhyta among the Greeks on grounds of rhyta being mentioned in a temple inventory of Delos; and Panofka's old-fashioned notion of the symbolic "meaning" of their painted decoration is again revived in this connection. Such notions are no longer taken seriously and need hardly be disproved by enumerating the many representations of pygmies and cranes (Leningrad 679, *ARV* 254), athletes (Bologna 586, *ARV* 545), and ephebes (Metropolitan 41.162.33, *ARV* 586), that are as common to the rhyton repertoire as Dionysiac subjects.

It is in the copious notes that the great value of Svoboda's study lies. Students will find here a wealth of material never before assembled in one place and not included in the older studies by Karo, Maximova, and de Mot, as well as information concerning recent finds of Scythian material such as a hoard of forty rhyta of ivory and precious metals announced by Svoboda to have been recently found in the territory of Stara Nisa by an expedition of the Academy of Science of the Turkoman SSR.

In the preface the author states that many important publications were not available to him. The following notes are therefore offered in the hope that they will be useful to those wishing to probe more deeply into the subject.

P. 11, note 3 *for* A. M. Richter *read* G. M. A. Richter. P. 11 *for* Abb. 25, p. 84 *read* Abb. 26, p. 85. P. 51: the rhyton from Samsun in Munich is a bull's head, not a mule's head. Pl. vb and p. 52: the rhyton terminating in a horse protome is not of gold and from Cappadocia but black glaze and from Vulci. It was excavated in 1878 (see F. Messerschmidt, *Nekropolen von Vulci*, 99) and acquired by the British Museum at the Castellani Sale in 1884. (*Cat. Vente 17 mars—10 avril 1884* p. 22, no. 107). P. 57: the rhyton from Kul Oba has a double orifice in the head, therefore could not have been drunk from over the brim. Pp. 60ff: three pages of text are devoted to refuting a theory ascribed to A. Adriani (*BSRAA* 33 [1939] 350ff), that rhyta originated in Egypt. I find no such claim in Adriani's text and fear that mistranslation of a key word has given rise to confusion over Adriani's dating of the terracotta rhyton from Suwa. An earlier scholar, Duncan, had dated this vessel ("senza serio motivo," according to Adriani) to Dynasty XVIII. Adriani says that the circumstances of the find do *not* permit a dating much prior to the silver rhyton from Tuch el Garmus. His unstated conclusion, therefore, is that there are no rhyta in Egypt before the Hellenistic period. P. 70, note 238: G. M. A. Richter (*AJA* 45 [1941] 381) is cited for Attic art export to Thrace in the fourth century B.C. Again, I can find nothing in the quoted text to support this reference. P. 72: *for* Abb. 21b *read* Abb. 20b. P. 74: the bronze stag's head from Herculaneum in the Naples Museum is not a rhyton but a fountain head.

To the list of Near Eastern rhyta add: Tahsin and Nimet Özgüc, *Karahüyük* (Ankara 1949) pls. XLVII, 3 and 4; Tahsin and Nimet Özgüc, *Kültepe Kazisi Reporu* 1949 (Ankara 1953) figs. 281-83; *Ausgrabungen in Sendschirli* V, pl. XX; E. Akurgal, *Phrygische Kunst* (Ankara 1955) pls. 34f; A. Godard, *Le Trésor de Ziwiye* (Tehran 1950) fig. 58; R. Young, *AJA* 59 (1955) pl. 1, 5; Metropolitan Museum 55.10 (*BMMA* 15 [1956-57] 10, 11, 14); University Museum, Philadelphia 53.31.1 (*BMMA* 15 [1956-57] 10, 14, 15).

To Aegean rhyta, add the following: fox's head from Tiryns in the Ashmolean Museum (de Mot, *RA* 4 [1904] 216, where he calls it a dog's head); deer's head from Lindos in Constantinople (Maximova, *Vases Plastiques*, 78, note 1); mule's and ram's heads from Enkomi in the British Museum (Murray, *Enkomi*, pl. 3; S. Marinatos, *AA* 43 [1928] 533ff, fig. 1; H. R. Hall, *JHS* 48 [1928] 64ff); animal's head from Lindos in Istanbul (Maximova, 78, note 1); animal's head in Candia (Maximova, 76, note 1); tubular rhyton from Lerna (J. Caskey, *Hesperia* 24 [1955] pl. 23d); bull's head from Ialysos in Rhodos (G. Jacopi, *Lo Spedale dei Cavalieri*, 93, fig. 51); bull's and ram's heads in the British Museum (de Mot, 215); dog's head in the Ashmolean Museum (de Mot, 215, fig. 4).

To note 233 (representations of rhyta on banquet reliefs) add the following: Museo Chiaramonti, 594; Venice, Museo Archaeologico, Inv. 25; Istanbul (Mendel 976, 1012, 1021, 1026); Samos (German Institute Photo 732); Louvre (W. Froehner, *Catalogue des Antiquités*, nos. 98, 100, *Encyclopédie photographique de l'art, Éditions "TEL,"* pl. 261); Wiegand-Schrader, *Priene*, fig. 473.

To note 198 (representations of rhyta on Etruscan urns) add the following: Vatican, Museo Gregoriano (*Musei Etrusci quod Gregorius XVI . . . constituit monumenta ecc.*, Vaticano 1842 [ed. A] pl. 103, 2, 6); Florence, Museo Archaeologico, nos. 5775, 5653; British Museum (*Catalogue of Sculpture*, I, part II, D64); Villa Albani (unnumbered).

To note 249 (bronze Lars holding rhyta) add the following: G. M. A. Richter, *Greek, Etruscan, and Roman Bronzes* 265; H. Stuart Jones, *Sculpture of the Palazzo Conservatori*, pl. 115; De Ridder, *Les Bronzes antiques du Louvre* I, nos. 683, 686; H. B. Walters, *Catalogue of the Bronzes in the British Museum*, 1568-1577; Deonna, *Bronzes figurés antiques de Genève*,

163; Babelon-Blanchet, *Catalogue des Bronzes antiques de la Bibliothèque Nationale*, 741, 743, 745; S. Reinach, *RSGR* V, pp. 232, 3, 6, 233, 2, 234, 1; Museo Ostiense (two Lars, unnumbered); Vatican, Museo Profano (two Lars, unnumbered); Munich, Museum Antiker Kleinkunst (only the bronze rhyton is preserved, unnumbered); Naples (eleven Lars with rhyta, room of the small bronzes, unnumbered).

Part II of *Neue Denkmäler* is Dimiter Končev's eagerly awaited final publication of the richest treasure to have been unearthed in Europe since World War II. The nine sensational gold vases here discussed were accidentally discovered in a claypit near the village of Panagurishte, Bulgaria, on December 8th, 1949, and subsequently announced as "vessels from which Alexander the Great may have drunk" in the *Illustrated London News* of December 11th, 1954. More detailed preliminary publications as late Classical-early Hellenistic pieces appeared in *Archeologické rozhledy* (1953) and *Archaeology* (Winter 1955).

The hoard consists of four rhyta, three oinochoai, a phiale, and an amphora, all of pure gold and weighing a total of 6,164 grams. Three of the rhyta are in the shape of animal heads, two stags and a ram. The fourth is horn-shaped and terminates in the forepart of a leaping goat. The three oinochoai are in the shape of female heads and differ slightly from each other. The phiale, which is mesomphaloid, has five concentric rows of relief decoration on the outside: rosettes, acorns, and three rows each containing twenty-four negro heads. The most remarkable object in the series is a footless gold amphora with two heraldically disposed centaurs as handles.

Although the concise descriptions and the line drawings offered in the text add much that was previously unclear, it is to be deplored that the photographic reproductions of the plates leave so much to be desired. With few exceptions, the same illustrations that appeared in *Archaeology* are here reproduced less successfully on paper of a coarser grain. The new photographs that have been added, such as the figures on plate VIII, are badly lighted and printed on paper of too high contrast, thus making it difficult to study details. Moreover, there is no adequate illustration of the dancing maenads of rhyton no. 3, whose draperies would seem to be pertinent to a stylistic analysis.

Admirably as the Panagurishte Treasure has been described in *Neue Denkmäler*, it is not likely that the last word has been said about its date, origin, or significance. With the amount of information at last available, the time has come for a closer scrutiny of the vases than has been possible before. The Panagurishte gold vessels have been called Attic, first quarter of the fourth century B.C. This attribution, which has been accepted by Ch. Picard (*RA* [1954] 92), seems to the author of this review to be in need of reappraisal.

A re-examination of the inscriptions on the vases indicates little justification for Končev's pronouncement ("inscriptions characteristic of the fourth century B.C."). In fact, the same characteristics that he cites as evidence for early dating remain unchanged or reappear at a later date.

Far from being "normal for the Classical period," as the author states, the forms of the vases with the single exception of the phiale create considerable problems against a Hellenistic background, but are more readily explained in the light of comparison with later monuments such as the centaur-handled amphora from Concesti (Matzulewitsch, *Byzantinische Antike*, pl. 34) and the oinochoai from Berthouville (Babelon, *Le Trésor de Berthouville*, pls. 5ff, esp. the necks and rims). The shape of Panagurishte rhyton no. 4 is represented in the Hellenistic period by the silver rhyton from Tuch el Garmus and in Apulian ware, but must also have been common in Roman times, witness the similar representations on the Palestrina mosaic and on a skyphos from Berthouville.

The Panagurishte vases display certain stylistic characteristics that are common to the relief style of late antiquity. It will be noted, for instance, that the reliefs of rhyton no. 4 (Apollo, Hera, Artemis, Nike) really do not represent a special scene, but consist of four frozen representations of gods and goddesses holding attributes. This quality applies also to the reliefs of rhyton no. 1 where a mythological subject is ostensibly represented: the Judgment of Paris. Instead, four figures (Athena, Paris, Hera, Aphrodite), isolated from each other, are placed around the rim of the vessel. There is no suggestion of dramatic action, and were it not for the inscriptions and the Phrygian garb of Paris one would find an interpretation difficult. How differently Hellenistic artists treated this charming subject!

Ground is indicated only on the reliefs of the gold amphora. Not so much as a strip of earth appears under the feet of the gods and goddesses on any other vessel. But note how unconvincingly the figures on the gold amphora stand on their peculiar hillocks, particularly the right-hand figure of pl. XVIII, top, whose feet dangle limply into the palmettes below.

Where thrones are indicated, gods and goddesses sit precariously upon them, as if in danger of sliding forward. In the case of Paris on rhyton no. 1 or Eriope on rhyton no. 3, the figures are invisibly supported in a seated position with no throne or other form of seat indicated. Hera, on rhyton no. 4, is seated on a throne represented in a combination of frontal and side views.

The club of Hercules on rhyton no. 2 (Hercules and the Cerynean stag) is pasted against the foreground without any reference to the scene depicted. The same may be said of the helmet of Athena on rhyton no. 1, which she holds aloft in a quite meaningless gesture. The hands of the figures, where we are able to see them in the reproductions, are lifeless and often out of proportion. Thus, the hand of Aphrodite airing her veil on rhyton no. 1 is actually larger than her head. The figures themselves are characterized by careful anatomy combined with crudely schematized drapery (pl. XIX), bulging eyes (pl. IV), and improbable stances (pl. XVIII). Finally, one will note the profusion of dots,

stars, and hatchmarks sprinkled over the surface of the vessels. This kind of ornamental elaboration, combined with the inconsistencies and omissions described above, seems difficult to reconcile with art of the Classical period.

Yet it cannot be denied that the figures also express greater organic vitality and freedom of action than we are accustomed to find in the reliefs on objects of late antique treasures such as those of Mildenhall, Taprain, or Gross Bodungen. Closer stylistic analogies will perhaps be found among the treasures of the second and third centuries A.D., such as those of Berthouville and Marengo. A closer dating, based on more detailed study, will be the aim of a separate paper.

As important as the date and origin of the Panagurishte Treasure is its major contribution to our knowledge of ancient mythology; for the reliefs of the gold amphora present us with an otherwise undocumented version of the Herakles myth, the details of which are as enigmatic as they are fascinating.

Far from depicting "Odysseus and his comrades penetrating the palace of Lykomedes," as Končev and Picard have tentatively suggested, the scene represents four wild men, three of them bearded, brandishing swords as they are about to force their way into a palace. A fifth bearded man to the left is blowing on a trumpet. To the right we see Herakles and his companion Iolaos, both with clubs, deeply engrossed in conversation. They are as yet obviously unaware of what is happening close by. Herakles is leaning on his club and pointing with his right hand at an object in his left hand which is described by Končev as a small vessel, probably a cup, with obscure drawings on its surface and surmounted by a cone-shaped object, apparently an egg or a spool of wool. Iolaos raises his right hand in surprise at what he sees on this mysterious object, which is indeed not a cup but an oracular liver, with the cone-shaped object its *lobus pyramidalis*. The scene is one of divination. It is the moment before the climax of the action which will take place inside the palace and the outcome of which is already apparent: Herakles, suddenly aware of the goings on nearby, will come to the rescue and put the invaders to rout.

This pattern of the itinerant Herakles ignorant of nearby disaster is familiar to us from ancient literature (e.g. *Alcestis*), but nowhere do we have a parallel representation in art. Who is inside the palace? And what does Herakles learn from the liver?

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PHRYGISCHE KUNST, by *Ekrem Akurgal* (Veröffentlichungen des archäologischen Instituts der Universität Ankara No. 5). Pp. viii + 152, pls. 68, figs. 55. Ankara, Archäologisches Institut der Universität, Dil ve Tarih-Coğrafya Fakültesi, 1955.

The study of the Phrygians is an assignment long neglected and recently rehabilitated. As the chief successors to the Hittites in Asia Minor, the Phrygians have a multiple bearing on problems concerning the fall of the Hittite Empire, the Dark Ages, the geometric and orientalizing periods of Greek art, the overland East-West contacts in Asia Minor, and the infiltration of Greek and Lydian influences from West to East. Two major landmarks in Phrygian research are: the theoretical and concentrated attack on the problem by Ekrem Akurgal, professor of archaeology at the University of Ankara; and the practical approach by the University Museum which has reopened the site of Gordion in 1950 (cf. *AJA* 59 [1955] 1-18; 60 [1956] 249-266; 61, this number). Both attempts were eminently justified: the inventory-taking by Akurgal with the aid of modern archaeological means of comparison; and the focusing on the most prominent site and cemetery of the Phrygian kingdom by the University Museum under the direction of Rodney S. Young.

Although preliminary reports on the Gordion campaigns have been appearing since 1951, the book by Akurgal can to all intents and purposes be called a study of the pre-1951 situation, as hardly any relevant literature on the new Gordion campaigns could be incorporated in the volume reviewed here (the preface was written in March 1954; of the new reports only *UPMB* 16 [1951] No. 1, and 17 [1953] No. 4, pp. 1-39 were available to the author). An objective discussion of the contents therefore should not expect Akurgal to have prognosticated the results of the subsequent Gordion campaigns; on the other hand some of the newly available data may be referred to here in so far as they reinforce or tend to modify the main thesis of Akurgal's volume.

The organization of the material evidence as presented in *Phrygische Kunst* is clear and competent. The categories are reviewed one by one: pottery, sculpture, architectural terracottas, bronzes, architecture, with minor summaries about cult, language and writing. The amount of evidence available for individual chapters is very uneven. Obviously, pottery is represented in bulk and takes a major place in the analysis. It is well-illustrated, partly in good reproductions of Alishar drawings, partly in new photographs, among which the illustrations of the old Gordion material in Istanbul are most useful. Akurgal rephotographed several of the vessels found by the Koerte brothers in their campaigns at Gordion. New also are the plates showing some of the sherds from Alaeddintepe in Konya (pls. 21-22).

The illustrations in the sculptural subdivision are less helpful, but the forthcoming publication of the Phrygian rock-monuments by C. H. E. Haspels will remedy the situation. There are some good views of comparative material from Paphlagonia in Akurgal's book. Terracottas fare well; one is grateful to have more precise data about the Pazarli revetments with measured drawings and profiles offered in the text, and clear photographs in the plate section. The volume

is liberally printed (minor misprints do not mar the reading) and well-produced.

The main thesis of the book runs through the various chapters as the elements are examined and is clearly summarized in the conclusions. The Phrygians are accepted as bona fide immigrants from Thrace, who invade Asia Minor at the end of the Late Bronze Age. The Assyrian references to aggression by the Muški and their five kings in the days of Tiglatpilesar I (c. 1100 B.C.) are justly taken at face value as referring to Phrygian attacks in Eastern Anatolia (Mita is not involved in this aggression, however, and the wording on pp. vii and 24 should be corrected in this sense). The Phrygians are not yet capable of founding a coherent state in this period, but rather continue to lead a nomadic existence during the Dark Ages. Akurgal assumes that the sites in central Anatolia were deserted from about 1200 to 800 B.C., their land being used as pastures for the cattle of the nomads. He points out that the interruption of habitation in this region is evident from the loss of the old names of sites; so instead of continuity from the Bronze Age on as in the Southeast (with names like Niğde, Malatya, Maraš, Adana, Tarsus) we have new names such as Gordion, Ankara, Yozgat, Çorum, Tokat, Boğazköy, Kirşehir (112).

According to Akurgal's interpretation, the first central Anatolian settlements of the Phrygians are to be found in the bend of the Halys by the beginning of the eighth century. Perhaps Ionian expansion in the direction of Hellespont and Propontis forced Phrygians to move from the Northwest to sites in central Asia Minor. In any case, from here on the analysis works with sufficient material evidence to produce a chronology of events subdivided in four periods by Akurgal:

I. c. 775-725. The early Phrygian phase, pre-literate, mostly based on ceramic evidence from Alishar.

II. c. 725-676. Gordion becomes the capital of the Phrygian kingdom (perhaps under Assyrian pressure from the East). Evidence for ceramic arts, burial customs, possibly introduction of writing. The Cimmerian destruction puts an end to this phase, the heyday of Phrygia.

III. 676-585. A period of small kingdoms (Gordion, Alishar). Writing, cremation, increasing contact with the West.

IV. c. 585-500. The capital is shifted to Midas City. This is the period of the rock-monuments and rock-cut inscriptions. Much contact with the Greeks, introduction of monumental sculpture.

This general scheme has several good arguments to recommend it, and it is to be appreciated as a working hypothesis which puts scattered data in a coherent framework. One cannot even say that at the present stage investigations at Gordion have disproved the basic parts of Akurgal's theory, although they tend to reinforce some doubts especially regarding the Dark Ages and Akurgal's first phase.

There certainly is a gap in the habitation of some central Anatolian sites (e.g. Boğazköy, Alishar) after the violent destruction level c. 1200 (perhaps even earlier at Alishar). The change in nomenclature is significant, and so is the lack of continuity in archaeological material, although rebuilding of course took place, ultimately, right on top of the burnt Hittite ruins. But do we have criteria to measure the length of the gap? Akurgal courageously affirms this and refers to the ceramic evidence, the only group of material available in sufficient quantity to offer some safety in conclusions. Alishar with its profusion of pottery is the chief test-case.

In his first chapter Akurgal analyzes the style of decorated pottery used in post-Hittite Alishar, his "early Phrygian style." It is represented in large numbers of sizable kraters bearing the familiar panel designs of stylized deer set in fields with concentric circle filling ornaments (pls. 1-6). The reviewer is not so convinced as the author that the krater shape is the only one decorated in this period, but this point is less essential than the matter of stylistic affinities. As no other historical or cultural synchronisms are available, stylistic resemblances if present will provide the only absolute dates for this ceramic phase. To Akurgal, affinities to Greek art are obvious (33ff). He is reminded of silhouettes of animals in Greek geometric art, and specifically refers to late geometric sherds from Samos which even combine such silhouettes with a background filling of concentric circles (pl. H 1 opp. p. 33). The parallel is convincing; here we undoubtedly have the deer-and-concentric-circle style represented. The Samian sherds are almost unique on the Greek side, even on Samos; the Alishar kraters are common and profuse in Alishar and surroundings, as any visit to the collections in Ankara or Chicago will prove. Yet Akurgal says of the Samian sherds: "Dass hier etwa phrygische Einflüsse vorliegen könnten, wird wohl niemand behaupten wollen" (33). In this case as with the remainder of the alleged Greek affinities of the early Alishar style the reviewer's opinion is diametrically opposed to the author's, and it proves easy in discussion with Greek archaeologists to recruit adherents for the assumption that Samos is imitating Alishar rather than vice versa. The matter is still open to debate, but where stylistic affinities are concerned, none of the plates adduced for comparison (pls. D-H) seem of general relevance to the origins of early or later Phrygian vase-painting.

To the reviewer, the Alishar kraters are remarkably un-Greek in style and shape. They are monotonous and may have been produced for quite some time with little variation. Their chronology, once the Greek link is found unacceptable, remains as dark as before. No Greek or datable oriental imports are associated with these kraters at Alishar. The Rhodian seventh century sherd illustrated *OIP* 29, pl. III, 9 has no context and is more likely to belong with a different type of associates. Some of the Cypriote fragments from Alishar (several black-on-red sherds are in the Oriental Institute collection) could have been helpful, but again there are no reliable find groups. The stratigraphy at Alishar is far from helpful. How uncertain things are is demonstrated by the attribution in *OIP* 29 of a

group of pots clearly belonging to the Hittite Empire (rare at Alishar) to level 4aM, the *upper*most stratum of the post-Hittite level 4M (pots c 1565-1567, c 2263, pp. 352, 385f, 388; many other vessels of this type are erroneously illustrated as post-Hittite, e.g. d 1279, d 2150, d 2361). In *Phrygische Kunst* fig. 25 (= Alishar c 1567, fig. 24 = Alishar e 1710) should be omitted; this is a typical Hittite cup and strikingly unlike Phrygian profiles.

Gordion has not yet been sufficiently tested to give evidence for continuity or interruption of habitation in the Dark Ages. The test-pit made in 1950 showed some promise of continuity. Noticeable, however, is the absence of the Alishar krater style, Akurgal's "early Phrygian" category at Gordion. Akurgal explains this by assuming that the Alishar kraters antedate the Phrygian occupation of Gordion; but the question whether the early Alishar style is truly Phrygian at all should be raised and examined with more emphasis than is found in the volume discussed (21). It is conceivable that the Phrygians were settled in Gordion or elsewhere near the Sakarya, making monochrome grey ware of which the profusion is as remarkable in the West as its scantiness is in the East, while their contemporaries at Alishar were creating the deer-and-circle style. With the absence of archaeological synchronisms, and in view of the lack of Phrygian linguistic evidence, the Alishar post-Hittite stratum to which the kraters belong cannot be certified as Phrygian (cf. the profusion of Hieroglyphic Hittite seals in level IV, *OIP* 30, 450). Continued scepticism seems justified, and an increased endeavor should be made to analyze the levels immediately overlying the burnt remnants of the Hittite Empire. Here the burden of proof will be with the Gordion excavations. Some support for the Phrygian attribution of the Alishar style may be found in the fact that the most excellent painted pottery style of Akurgal's next phase ("ripe Phrygian" from c. 725 on) is aware of the Alishar style, which it imitates in concentric circle background filling-ornaments (e.g. pls. 19b, 21b, 22 below). On the other hand, connections with Alishar still are not close in the ceramic field (cf. *AJA* 58 [1954] 167f). The best painted style of phase II so far is exclusively known from Gordion and Konya (pls. 11, 12, 14, 16, 18-20, 21b, 22). This style is very different from the weak geometric and wavy line styles also current in West Phrygia. In Gordion at least it forms a negligible percentage of the total pottery bulk, even if the painted fragments of all styles are measured against the quantity of grey monochrome wares (perhaps 1:99). At Alishar figures are entirely different, although unavailable (cf. *OIP* 29, 289, grey ware "not infrequent").

Akurgal's analysis of phase II is on safer ground. He points out the historical importance of Midas and his contacts with East and West, and anticipates the discovery of the Cimmerian destruction level at Gordion as a major archaeological border-line (124: The destruction in its most violent form is now exposed in parts of the city mound, cf. supra). Gordion is the leading city of Phrygia in this phase. Its architecture and the contents of its tumuli are of unsuspected variety and wealth. The importance of Phrygian metallurgy is correctly emphasized by Akurgal. Textiles, woodcarving, primitive beginnings of sculpture have now come to light. The lack of a native Phrygian sculptural tradition is obvious in the uncouth appearance of the lion sculptures from Gordion (*AJA* 60 [1956] pl. 92 figs. 42-43); and borrowings from the neo-Hittite repertoire were as necessary as at Ankara, where the "Phrygian" orthostats owe much more to neo-Hittite technique (68).

Two points may be raised regarding the many aspects of phase II discussed by Akurgal. The first one is that of ceramic imports. Again, as at Alishar in phase I, Greek material is conspicuous by its absence. In spite of Akurgal's optimism (124: the destruction level will be datable with the aid of "die in Gordion nie fehlenden griechischen Importstücke"), neither the city mound nor the pre-Cimmerian tumuli at Gordion have produced Greek objects. Some oriental and Cypriote imports are available (cf. tumulus P, *ILN* November 10, 1956, 799; *AJA* this number) but apparently little material proof of Midas' contact with the Greeks is to be found at Gordion. One shares Akurgal's conviction that Greek imports will ultimately appear in the predestruction level, although there need be no illusion about the size of the collection.

The second point concerns writing. No graffiti, inscriptions, tablets of any kind are associated with the pre-Cimmerian Phrygian period at Gordion or elsewhere. Midas was in diplomatic contact with East and West. He may have corresponded in cuneiform with his allies in Carchemish, Tabal, Urartu, and his archives may await sudden exposure at Gordion; but the Phrygian alphabet is as yet wholly absent in this phase. The Hama graffiti are not Phrygian (30, 106, doubted also by Akurgal).

The increase of contact with the West through Lydians and Ionians is clearly noticeable in Akurgal's phases III and IV. Now ceramic imports help to build a chronological framework (Rhodian bird bowls being especially cooperative, p. 50), notably by their presence in tomb groups. Phrygian alphabetic writing appears, and the military defeat by the Cimmerians seems to have had few after-effects on the prosperity of the kingdom in the seventh and sixth centuries.

Midas City, prominent in phase IV, was actually occupied before that period (585-500). The major archaeological question mark is that attached to the appearance and chronology of the Phrygian rock-cut façades. Akurgal speculates about their origin and is inclined to give the Lycians priority status in this category. Although the architectural types of Lycia are certainly autochthonous and pre-Greek (contra p. 89, where the ogival types are unnecessarily derived from Greece), Phrygia recently has come up with strong evidence that its façades and akroteria are fully developed in the eighth century, Akurgal's phase II

(Gordion: *AJA* 60 [1956] pl. 93 fig. 41; 61, this number; *ILN* November 17, 1956, 858 fig. 9).

As explained above, much of the interpretation of Phrygian culture is subject to annual modification with the progress of work at Gordion. Akurgal's book is an indispensable preparation for those interested in following the case of Phrygia. It contains the best available compendium of Phrygian art, and presents the material with refreshingly challenging comment. The factual contents as well as the ideas of this book will be of great value to post-Hittite studies, to which Akurgal continues to make essential contributions in the field as well as on the shelves of archaeological libraries.

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ALALAKH: AN ACCOUNT OF THE EXCAVATIONS AT TELL ATCHANA IN THE HATAY, 1937-1949, by *Sir Leonard Woolley* (Reports of the Research Committee of the Society of Antiquaries of London No. XVIII). Pp. xi + 411, figs. 81, pls. 131. Oxford University Press for the Society of Antiquaries, Burlington House, London, 1955. £7.7.0.

The plain of Antioch and the Amuq is a region of importance to archaeologists interested in the interplay between Orient and Occident in any period. Trade routes from the Northern Euphrates valley here approach the fertile hinterland of northeast Mediterranean ports, where traffic from Cyprus and the Aegaean meets the northernmost extension of Egyptian interests along the Syrian coast.

The most comprehensive survey of the Amuq plain was undertaken by the University of Chicago during the years 1933-1936 (cf. R. J. Braidwood, *Mounds in the Plain of Antioch, OIP* 48 [1937]). It led to the recording of some two hundred mounds, landmarks of the dense ancient occupation of this fertile district, and to trial excavations in eight sites which furnished a reliable set of archaeological periods and subdivisions from "neolithic" to Byzantine times without pursuing any spectacular phase or settlement in detail. As a result, an approximately complete framework of synchronisms is available to the student of comparative archaeology; and more detailed prehistoric or historical results can be expected to supplement rather than modify the outcome of the systematic Chicago exploration (for the final analysis of the early periods, cf. *OIP* 61 [forthcoming]; for the classification by periods cf. R. J. Braidwood in *Relative Chronologies in Old World Archeology* [1954] 34-41; *AJA* 41 [1937] 8-16; *Belleten* 51 [1949] Table I after p. 478).

Sir Leonard Woolley was attracted to the Amuq region by his interest in the oriental connections of the Aegaean world. He rightly suspected that Minoan eastward traffic would have aimed at the ports of North Syria, whose leading inland cities should contain clues to a proper understanding of the development of Cretan civilization (p. 1). He selected Tell Atchana, one of the many sizable mounds in the Amuq, for excavation. As the work progressed from 1937-39 and 1946-49, major discoveries were made, identifying the site of Atchana as that of the ancient city of Alalakh, and offering a wealth of archaeological material to reconstruct the culture of North Syria in the Bronze Age. The final report, now presented in book form, surveys the results. While the outcome certainly vindicates the choice of Atchana as an important historical site in the Amuq and emphasizes the remarkable archaeological sagacity with which Sir Leonard selects his sites, it will be interesting to return to the question of Aegaean relations in the course of this review.

The excavations were elaborate and the categories of valuable new evidence are so manifold that a summary cannot do justice to them here. If a selection of aspects is offered here, the aim is to supplement the philological and historical discussions which are prospering around the Alalakh material (cf. B. Landsberger, *JCS* 8 [1954] 51ff; W. F. Albright, *BASOR* 144 [1956] 26-29). To the archaeologist precise absolute dates still remain things to avoid in third and second millennium Syria; but his first interest and contribution will lie in a correct interpretation of comparative stratigraphy, synchronisms, cultural relations and origins.

The first major question to be taken up is that of the range of the material from Alalakh in neutral terms such as the Early, Middle and Late Bronze divisions or in rough chronological estimates. It is clear from the Amuq A-M sequence and the stratified data available from several other mounds in the Amuq how the new material is to be correlated. Sir Leonard in his first chapter discusses some of the finds made by him and members of his staff on two supplementary sites near Atchana. At Tell-esh-Sheikh a local variant of 'Ubaid pottery (corresponding to Amuq E) and perhaps some earlier material were encountered (6). At Tabara al Akrad an abundant deposit of Khirbet Kerak type pottery was found, as in other Amuq sites (Amuq phase H especially, some in I). The "Hittite" affinities of this pottery, hypothesized by Sir Leonard (8f), are entirely unproved and of no value in the clarification of the historical concept of the "Hittites." East Anatolian connections of this intrusive pottery are beyond doubt (cf. S. Hood, *Anatolian Studies* 1 [1951] 116ff; W. Lamb, *Anatolian Studies* 4 [1954] 21ff).

In the normal Amuq sequence such as is represented at the site of Tell Tainat (opposite Atchana across the modern road), we find the following phases I and J (contra p. 9, note 1) ceramically marked by the abundance of wheelmade "caliciform" pottery, some of it with paint and incised wavy lines through painted bands, also characterized by a good metal industry and chronologically correlated with the end of the Early Dynastic III and Akkadian periods in Mesopotamia or Early Bronze III in Cilicia. A change is noticeable with the beginning of phase K in the Amuq and Middle Bronze in Cilicia, when a new type of

painted pottery makes its appearance (H. Goldman, *Excavations at Gözlü Kule—Tarsus* II, 164ff, figs. 287ff).

Sir Leonard claims that the lowest strata at Atchana overlap the upper levels of Tabara al-Akrad (8). There is no proof that at either site Amuq phases I and J, i.e. roughly speaking the second half of the third millennium, are represented in proper stratification. Some of the pottery published in *Alalakh* belongs to Amuq I and J types (some fragments of "smeared wash" ware of Chicago terminology [here called "reserved paint!"] occur in Alalakh levels XVII-XVI, pp. 307, 308, 379; incised goblet fragments [here called "sgraffiato ware"] occur as strays in levels VIII-VI, p. 352, clearly out of context; some initial paint of "drip" pattern on pitchers in level XVII, p. 308; bottles with painted hatched designs in XVII [307]; it might be mentioned incidentally here that the bevelled rim bowls in level XIV [308f, 322 type 13, 379] cannot be of the same type as those characteristic of Amuq phase F and Mesopotamian Protoliterate levels); but the quantity of these earlier fragments seems insufficient to correlate Alalakh levels XVII-XVI with Amuq I and J, especially as the new types of Amuq K style painted jugs and bowls have made their appearance in level XVI (pl. xc). Level XVII, the bottom level at Atchana, may just represent the end of Amuq Phase J. A change in habitation of the Amuq plain seems to occur at this time. Several sites are poorly represented in the next phase (Tell al-Judaidah, e.g.; Tainat seems abandoned in favor of Atchana), and the new style of painted ceramics may well be the exponent of a new type of settlers in Cilicia as well as the Amuq region.

Chronologically, this means that Alalakh XVII belongs at the end of the third millennium (with late Amuq J, and the end of Early Bronze III in Cilicia) and that Alalakh XVI and following are typical second millennium levels. No tablets occur as external dating evidence until level VII, which is epigraphically to be correlated with part of the first Dynasty of Babylon. Levels XVI-VIII represent a consistent archaeological phase with little internal development, and the first few centuries of the second millennium seem ample accommodation for them.

Sir Leonard assumes that levels XVII-VIII, continuing the prehistoric development at Tabara al Akrad, should be estimated to have lasted from c. 3400-1780 B.C., thereby creating a remarkably stagnant picture of material culture at Alalakh, and attempting to upset all conventional chronological schemes. As his arguments and conclusions appear elaborately in print here and elsewhere (*A Forgotten Kingdom*, Penguin Books 1953, 38ff) it may be useful to emphasize that not only is the ceramic evidence directly opposed to the high chronology offered by Sir Leonard but also no other category of evidence upon close scrutiny supports a date for level XVI before 2000 B.C. There are no architectural features requiring an early dating of levels XVII-VIII. The mud brick columns of level XII (378), if correctly interpreted as such, imply no connection with a specific period in Mesopotamia. The chief supporting category on which Sir Leonard bases his chronology is that of cylinder seals. Several seals and impressions are associated with crucial levels (XIII-X). They are illustrated *Alalakh* pl. LX and their chronological importance is discussed 378f. In order to obtain an expert and objective estimate of the chronological range of these seals I asked Dr. Edith Porada to analyze the relevant pieces. She kindly contributes the following considerations:

"The cylinder pl. LX, No. 1 was dated in the Early Dynastic period by Sir Leonard because it shows 'two people drinking through tubes which is one of the standard themes of the Early Dynastic period recurring at Judeideh . . .' The scene of the cylinder from Alalakh, however, varies from the standard Early Dynastic rendering of the theme in which two figures, either identical or differentiated as male and female, are shown to be of equal rank by being seated opposite each other on the same level. No. 1 shows, on the contrary, only one seated figure, a female to judge by her hair dress, holding one of two tubes protruding from a vessel. Opposite her stands a man holding the second tube and presumably drinking through it. A third much smaller figure seated next to the vessel may be replenishing the liquid. In the rare Early Dynastic examples from Mesopotamia where a vessel with protruding tubes stands between a seated figure and a *facing* standing one (e.g. *OIP* 72 [1955] No. 358 from Khafajah; L. Delaporte, *Catalogue . . . Musée Guimet*, Paris 1909, No. 23; *Corpus of Ancient Near Eastern Seals . . .* I, New York 1948, No. 128 which is somewhat equivocal), the latter gives the impression of serving the seated drinking figure rather than of partaking of the same liquid as in the Alalakh scene. This scene might be related to one rendered in the Syrian style of the 18th to 17th centuries B.C. (A. Moortgat, *Vorderasiatische Rollsiegel*, Berlin 1940, No. 526), convincingly interpreted by Moortgat as a communion between deity and worshipper. Such a variation of the standard Early Dynastic motif could well have developed in the region of North Syria and Anatolia where the use of reeds or metal tubes for drinking beer was not only known but may have even originated (cf. A. L. Oppenheim, 'On Beer and Brewing Techniques in Ancient Mesopotamia,' Supplement to the *JAOS*, No. 10 [1950] 12). The theme of No. 1 from Alalakh therefore cannot be taken to indicate the date of the seal in the Early Dynastic period. The only possible internal evidence for a date is given by the hair-dress of the female figure if a projection above the back of the head is correctly interpreted by this writer as an abbreviated rendering of the ends of the hair which is tied in a loop. Such a hair dress would correspond to that of many enthroned female figures without divine horned miter, represented on Mesopotamian cylinders from the Akkad to the Larsa periods (e.g. *OIP* 72 [1955] Nos. 639 and 913) with abbreviated renderings as in Alalakh No. 1 found only after the Akkad period (e.g. A. Parrot, *Glyptique Mésopotamienne*, Paris 1954, Nos. 30, 165ff, dated in the third Dynasty of Ur, i.e. in the 21st century B.C.).

"Plate 60, No. 2 was assigned to the Early Dynastic period by Sir Leonard on the basis of the resemblance of the lion-headed eagle between two horned animals to the well known motif found on many monuments of Lagash. None of the Early Dynastic lion-headed eagles from Lagash or from any other Mesopotamian site, however, are double-headed as the monster on Alalakh No. 2. This form is occasionally found only in Neo Sumerian designs (L. J. Delaporte, *Catalogue des cylindres orientaux . . . Musée du Louvre* I, Paris 1920, pl. 10, 2 [T.110], drawing on p. 13; also in H. Frankfort, *Cylinder Seals*, London 1939, p. 143, fig. 38; H. de Genouillac, *Mission française de Chaldée, Inventaire des tablettes de Tello*. Tome II, Paris 1910; probably also G. Cros, *Nouvelles fouilles de Tello*, Paris 1910, pl. VIII:3), and subsequently in seals of North Syria and Anatolia as exemplified by cylinders of Syrian style dateable in the time of the Old Assyrian or Cappadocian merchant colonies in eastern Anatolia, c. 1900-1800 B.C. (e.g. *OIP* 47 [1940] No. 135 and *Corpus* I, No. 901). A magnificent stamp seal decorated with such a double-headed lion-eagle was recently found in Kültepe-Kanish, the ancient center of the merchant colonies. Moreover, the motif is seen again in pl. LXI, No. 23 from Alalakh, a cylinder which is related to No. 2 also by its linear style. The third seal design from Alalakh in which the same style is observable is the imprint pl. LX, No. 5 which should be reconstructed according to the extant cylinders of the type (e.g. *Corpus* I, No. 1093; L. Delaporte, *Catalogue . . . Bibliothèque Nationale*, Paris 1910, No. 58). These cylinders show a seated figure drinking through a tube under the bend of which are an aryballos-shaped small vessel and a staff which has a ball on one side and which may have been a rod around which a measuring line was wound. The earliest occurrence of these two objects in their present shape is found on Cappadocian seal impressions (cf. E. D. Van Buren, *AnOr* 23 [1945] 139). The impression No. 5 for which Sir Leonard suggested a Sargonid classification therefore cannot be earlier than c. 1900 B.C. A connection between Nos. 5, 2 and 23 is furnished by a cylinder from Byblos (M. Dunand, *Fouilles de Byblos*, Paris 1937, pl. CXXIV:2337) which shows in addition to the seated figure drinking from a tube as in No. 5, a goat with the head and neck rendered as in the goats of No. 2 and a human figure with a curious wedge-shaped protuberance on the head like the god in No. 23. These relations indicate that the seal designs here discussed belong to a distinctively North Syrian group of the 19th century B.C. Only No. 2 which shows wider spacing and somewhat more naturalistic modeling than the other seals of the group may be of slightly later date.

"Another cylinder for which Sir Leonard assumed an early date, c. 2400-2300 B.C. is pl. LX, No. 3. He drew attention to the fact that the figures are placed in a framed compartment which he considered typical of the phase c. 2800-1800 B.C. No seal design made before 1500 B.C., however, has (like pl. LX, No. 3) a frame filled with a herring-bone pattern probably meant to represent a tree. The most common occurrence of such patterns in vertical and horizontal frames dividing the representation into compartments, is found in seals and impressions from the time of the Mitannian Empire c. 1500-1370 B.C., corresponding to levels V (A) and IV at Alalakh (e.g. *AASOR* 24 [1947] Nos. 100, 125 from Nuzi). Indeed, a cylinder from Alalakh (pl. LXIV, No. 76) which probably came from the same workshop as No. 3 (note the similar rendering of the human figures by large oval drillings for head and shoulders and a few lines for the indication of the rest of the body with horizontal hatching along one leg to indicate a mantle), was found in level IV.

"In conclusion it may be said that none of the cylinders found in levels XI-XIII can be dated as early as suggested by Sir Leonard. Although he may be correct in assuming that No. 1 is the earliest stratified cylinder found at Alalakh, its date cannot precede the 21st century B.C. No. 5 should be placed in the 19th century, No. 2 perhaps a few decades later, and No. 3 in level IV, between 1450 and 1370 B.C."

This analysis and the ceramic evidence ought to make it clear that Alalakh levels XVII-VIII represent a period roughly to be equated with the beginning of the second millennium.

The second coherent phase of Alalakh stratigraphy, and in this case, history, is represented by level VII, undoubtedly the most rewarding stratum of the excavations. The royal and administrative center of the city is available in the excavated palace (91-106); and the tablets associated with it provided the historical framework, identification of the site and a sequence of local rulers (D. J. Wiseman, *The Alalakh Tablets*, London 1953; cf. *AJA* 59 [1955] 331-332; *JNES* 14 [1955] 196-199). However the precise sequence of royal names will have to be interpreted (cf. Landsberger and Albright *ll.cc.*), it is clear that the father and grandfather of the first local ruler at Alalakh (Yarimlim I and Hammurabi I, kings of Aleppo) belong in the Mari period, and that the destruction of the palace of level VII takes place after several (five?) generations.

The palace of level VII in size and scope is far less impressive than its counterpart at Mari, and it seems to represent a modest type of residence belonging to royalty of minor wealth and rank. It is important to notice the typical North Syrian use of polished basalt orthostats to line the base of the walls. This architectural feature is absent in Mesopotamia but orthostats are consistently used in Middle Minoan architecture, possibly in connection with North Syrian prototypes. The Alalakh palace of level VII is to be correlated with Middle Minoan III and has no direct bearing upon origins of Minoan palace architecture. Even so, it belongs to a type certainly older and native in Syria.

The best masonry in the palace at Alalakh is found in the funeral vault (room 17, 95-97). Sir Leonard seems unduly puzzled by this typical Asiatic arrangement of a funeral cellar built into a palace or mansion (one would interpret the rubble foundations above the

slabs as places for ceiling-beams, p. 97; there is a beam above the lintel, p. 96. The fill in the shaft is "particularly clean earth" which would seem to represent infiltrated dust. Schaeffer's identification of the room as a funeral vault [*Stratigraphie Comparée* 104] seems entirely correct, especially as burials were found in situ).

Fresco fragments turned up in various parts of the palace (228-234, cf. 92, 94, pls. XXXVII-XXXVIII). Unfortunately, too little is preserved to substantiate claims of Minoan affinities. The M.M.III period of the Atchana fragments makes similarities conceivable, but the bull's horn of pl. XXXVIII b may well belong to a sacrificial procession of Mari type, and the vegetation (pl. XXXVIII a) is not necessarily windblown: it could be seen sideways as foliage of a tree, again cf. Mari: A. Parrot, *Mari* (Ides Photographiques 1953) fig. 114.

There are no Middle Minoan ceramic imports in this level (or anywhere at Atchana, unless level V produced a stray sherd in the unconvincing piece pl. CXXIX, 1), and the presence of Aegaean affinities in Alalakh VII remains undemonstrated. Aegaean features in the palace at Mari (references to Kaftor as well as details of the murals) are stronger, and the lack of evidence from Alalakh may be accidental. In spite of this, one imagines that exchange of gifts or trade between Middle Minoan rulers and Syrian kings was concerned with leading kings and wealthy palaces: Byblos, Ugarit, Mari are more prominent in this respect than Alalakh.

Among the most striking objects from level VII are some excellent fragments of sculpture. The head ("Yarimlim") on pl. XLI-XLII is a piece of accomplished technique and style, related, ultimately, to neo-Sumerian traditions, but undoubtedly derived from Mesopotamia via intermediaries such as the Mari school. It shows that a sculptural tradition was established, although briefly, in Alalakh, as is also evident from the other fragments in level VII. The interruption in this branch of the fine arts is as marked as the break in other categories, and the destruction of level VII deals a devastating blow to the prosperity of the local dynasty.

What follows is Landsberger's *Dunkles Zeitalter*. He attributes the destruction of VII to the Hittites (Muršil's conquest of Aleppo and vicinity). Levels VI-V are dark periods in Alalakh because of the absence of written records and articulate works of art. One has to fall back on ceramics for cross-dating. The typical M.B.I-II painted pottery of levels XVI-VIII had gone out of use before the beginning of VII, when a preponderance of grey wares is observed (313f for types). In levels VI-V there is a revival of painted wares but of a new variety, related to Palestinian examples, most strikingly in the presence of Ajjul ware (386, cf. H. J. Kantor in *JNES* 15 [1956] 159f, Albright *BASOR* 144 [1956] 29). The black impressed ware characteristic of level V seems indeed an elegant derivative of Tell el Yahudiyeh ware (342ff). It is paralleled by L.B.I material from Tarsus and other Cilician sites (*Tarsus* II, 185ff) in slightly different shapes, but it does not occur in Ugarit or further south. Affinities to Tell Billa, early stratum 3 (E. A. Speiser, "The pottery of Tell Billa," *Mus]* 23 [1932-33] pls. LX-LXII) are clear in level V. Ceramic evidence corroborates the dating of level V in the opening phase of L.B. or the sixteenth century.

Literacy and palace building are in evidence again with the beginning of IV. The whole complex of levels IV-I is subject to philological and historical analysis; the written material consists of cuneiform tablets mostly from the palace and fortress of level IV, and the long text engraved on the statue of Idrimi (240, pl. XLVI) found buried in the ruins of the level I temple but historically to be attributed to a date in level IV (391ff, Landsberger *JCS* 8 [1954] 54ff: 1510-1480). Although the coordination of archaeological evidence, local epigraphic material and historical data from external sources (Egyptian, Hittite, Mitannian) has not been achieved to general satisfaction, the material for an interesting and well-articulated historical evolution of Alalakh is potentially available. The difficulties involved in correlating stratigraphical changes with known historical events are not peculiar to Atchana. Written monuments are often found out of context (Egyptian statues at Byblos and Ugarit are good examples).

From level IV to level I we move through the phase of political rivalry between Egypt, Mitanni and the Hittites to the conquest by Šuppiluliuma (Woolley: end of level IV, Landsberger: end of level II?), then through a period of Hittite rule to the breakdown of Hittite power and the attacks by the Sea Peoples. Alalakh is destroyed in these attacks (374, 376); and the reoccupation of the site is only slight (level O: some walls and graves, 398f, scarab of Ramses VI, 203). The survivors must have moved to Tell Tainat across the road, which had been abandoned while Alalakh was flourishing as a city from about 2000-1200.

The categories of archaeological material for levels IV-I are many and abundant. Architecturally, one notices that the palace of level IV is well organized, although made up of parts built in various phases (110ff). Polished basalt orthostats again line important walls. The entrance has a distyle porch and recessed staircase approached by paved causeways crossing the outer courtyard. The palace, like the majority of its counterparts in Syria, had painted wall decorations (117, cf. the house fragments pl. XXXIX).

The temple series of Alalakh, consistently represented at least since level XIV, continues with vicissitudes of destruction and rebuilding through levels IV-I. One seems to notice a persistence of a basically Syrian ground-plan, although the entrance-system may vary. The cult-room is wide instead of deep, there is always at least one anteroom and part if not all of the building has an upper story. The cella is double in level II which forms an exceptional feature in the series (79). Architectural ornamentation is attested by the reused lion sculptures found flanking the steps leading to the temple of level I B (pls. XLIX-LI, 86, 242). Syrian styli-

zation has remodelled these lions in an angularity unknown to the Hittite world. The orthostat block pl. XLVIII is however of good Hittite Empire style. It has relief on two sides and was therefore a corner block, but in level I B it had already been degraded to serve as a step of the temple (86). For the identification of the Tuthaliya mentioned on it cf. Güterbock, *JNES* 13 (1954) 105, 15. It must have formed part of a more elaborate carved orthostat lining of the temple in a previous stage under Hittite auspices.

If more precision is to be achieved in the correct historical attribution of levels IV-I, the gains in one of Sir Leonard's chief categories of interest will be great: that of Aegaean relations. The period in question is one in which North Syria is in increasing contact with the Mycenaean world, be it directly with Aegaean sites or indirectly with Cypriote colonists.

Ceramic analysis will help to articulate the levels. Three types of fabrics are of special importance to the Aegaean question: Cypriote imports, Mycenaean imports, and the possible Aegaean factor in the local transformation of designs painted in light on dark on the so-called Nuzu-ware (pls. CIIff).

It is to be regretted that Alalakh offers so little stratigraphical precision for the first two categories. Cypriote White-Slip and Base-Ring wares of the I and II varieties were found in abundance (354 f). The attribution of bull-shaped vases of Base-Ring I type to level VI (357, 360) and the even higher attributions for White-Slip bowls to levels VI and VIII (363ff) lead Sir Leonard to assume that the fabrics hitherto thought to be original with Cypriote potters of the L.B. age were actually invented and introduced elsewhere, not at Alalakh but at some mysterious site whose location cannot even be approximately determined (369).

If the Cypriote ceramic stratification at Atchana seems dubious, the Mycenaean situation is not more encouraging (369-76). L.H. III fragments are said to appear stratified in level VI (316 with note 1, in the fortress area and in a context which seems much later than VI in general) and in level V (317 with note 1, again among what are called "the well-stratified sherds from the fortress area"). The palace of level IV had an early L.H. III A fragment on a floor (370), and elsewhere more III A sherds are associated with level IV. Unfortunately, few of them are illustrated. Some L.H. III A krater fragments showing an octopus pattern with white dots (pl. CXXVIII h, i, j) come from levels IV, II, IV respectively (371); other fairly early looking krater fragments (pl. CXXVIII a, f, g) from temple level II or unstratified areas.

It would be desirable to have a complete catalogue of the Mycenaean material with precise indications of stratigraphical context, instead of the somewhat haphazard listing on pp. 369-76. Sir Leonard's plea to extend the lower date of L.H. III B to the destruction level, i.e. to the attack by the Sea Peoples which must have taken place shortly after 1200, deserves attention (373-76), and would gain more emphasis if his material were presented in full.

Some Mycenaean pottery is associated with the tombs found on the mound of Atchana: three pilgrim-flasks with inhumation ATG 38/6 (205, pl. CXXVII, c-e) dug into the ruins of level I; a stirrup-jar with inhumation ATG 37/21, level I (pl. CXXVII a); and, more intriguing, a pilgrim-flask (not illustrated) with cremation burial ATG 37/3 level I (204); one flask and fragments of two jars (not illustrated) with cremation ATG 39/68 (204f). The presence of some cremation burials dating pre-1200 B.C. is unmistakable at Atchana; the earliest certain cremation belonging to level II has a Nuzu-type amphora as a container (ATG 38/7, pl. CII c, p. 206); the latest cremation is assigned to level O and dated as post-destruction-level by the presence of a scarab of Ramses VI (203, ATG 37/2, not a poor grave).

Finally, a word about the modifications of the painted vases known as "Nuzu ware" and actually found in their Nuzu-variety in Kassite, Assyrian, Khabur valley and Amuq sites. This light-on-dark painted ware occurs at Atchana in levels IV-II, mostly. The basic Mesopotamian shape of this ware is the goblet on button-base. At Atchana we find a much enriched repertoire of shapes, including kraters, amphorae, bottles, kernoi, beakers, and zoömorphic vessels (pls. CII-CVII), none of these of Aegaean derivation. The designs are enriched in level II with a remarkably artificial floral construction (the "labrys and papyrus" plant, pl. CII a, CIII a, f).

The first sherds of this kind when collected on the surface of Atchana gave the misleading impression of being connected with M.M. II painted pottery styles. Since the excavations have assigned this Syrian light-on-dark ware an approximate range of 1500-1300 B.C., connections with Kamares ware are out of the question. Are there any affinities left on the Aegaean side in the proper period (L.M. or L.H. II-III)? The use of light-on-dark paint seems to be inspired by the color effects familiar to North Syrians from incised and inlaid Tell-el-Yahudieh ware and its Alalakh counterpart, the black impressed ware (pl. C-CI), as Sir Leonard points out (349). The light-on-dark paint which goes out of use in Crete after some ambivalent work in L.M. I, still lingers on as a subsidiary technique in L.H. Superimposed white is popular on pictorial kraters from Cyprus (the Mycenaean krater from Atchana, pl. CXXVIII a, has it on the horses) and sometimes seems influenced by, rather than giving inspiration to the Nuzu ware category, e.g. in the use of white dot-rosettes on Cypriote plates (F. H. Stubbings, *Mycenaean Pottery from the Levant* pl. XII, 9; Enkomi; *CVA* British Museum 1, II C b pl. 5), or, in the playful reversal of the color scheme in the light-on-dark zone of a bird krater from Maroni (*CVA* British Museum 1, II C b pl. 9, 12, C 332).

The "double-axe tree" of the level II repertoire at Alalakh still makes Sir Leonard believe in some remote revival of Middle Minoan patterns (350). Such artificial patterns, however, are not found in the M.M. repertoire. The Atchana labrys-and-papyrus construction is well-organized, related to sacred tree designs

in its symmetry, and a local combination of inspirations (cf. pl. cv, bottom row left and right, pl. cvi, the tree design on the legs of the tripod 8/202, related to Middle Assyrian sacred trees).

This long and, incidentally, detailed review is far from exhaustive. It indicates, I hope, the wealth of comparative and original material available at Alalakh to Near Eastern and Aegaean archaeology. The study and use of the final publication of Alalakh is far from easy, in view of the controversial nature of some passages and the lack of administrative detail (no concordances, many errors of reference, selective and sometimes arbitrary listings of material). To the patient reader much is to be gained. The site of Alalakh will figure prominently in second millennium history and archaeology. Its spectacular rise from oblivion is a worthy reward for the excellent choice and the hard work by the excavator, both equally evident in *Alalakh*.

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GRIECHISCHE GREIFENKESSEL by *Ulf Jantzen*. Pp. 119, pls. 64. Deutsches Archaeologisches Institut. Verlag Gebr. Mann, Berlin, 1955.

This study by the author of *Bronzewerkstätten in Grossgriechenland und Sizilien* enriches our knowledge of bronze protomes not only through publication of a generous selection from the Heraion at Samos but also by a general history of Greek cauldrons with griffin protomes. The inaccessibility or complete disappearance of much of the Samos material through the vicissitudes of time and war impeded the undertaking. Moreover, the factual gain which might have been hoped for from the systematically excavated Heraion —exact chronological placing of individual protomes or groups—remained largely unrealized because of mixing of stratified sherds and loss of field books. With one or two important exceptions, therefore, Jantzen was reduced to arranging the Samos finds, and relating them to other Greek finds, on the basis of technique and style (in that order of importance). The author's keen observation of technical matters at every turn inspires confidence in his general organization of the entire Greek material into types and subordinate groups.

A catalogue of all published griffin protomes is placed at the front of the book. To this corresponds a list of unpublished griffin protomes in the appendices. The remainder of the book is in effect an explanation of the catalogue with a short chapter inserted on the origin of the griffin cauldrons, two short chapters at the end on chronology and rod-tripods, followed by several useful appendices (but no word-index). Much information is compressed into the sixty-five pages of text in a sober factual manner with a marked reserve in what concerns aesthetic appreciation of the protomes as living works of art (compare, for example, the author's rather dry remarks on p. 66 about the superb protome No. 77 from Olympia with Kunze's description in 2. *Bericht über die Ausgrabungen in Olympia*, p. 114). The majority of the protomes discussed are illustrated in good clear profile (and occasionally frontal) views which make use of the text easy and constitute a handy collection for reference.

A few minor bibliographical criticisms and additions may be inserted here, in fine print as it were. A more consistently generous, perhaps critical, bibliography would have increased the reference value of the catalogue. There is some unevenness in the citing of illustrations, e.g. Kunze's *Meisterwerke der Kunst*, *Olympia* plate 25 is cited for No. 81, but idem, plates 23-24 are not cited for No. 77. The reference to Buschor's *Plastik der Griechen* for No. 78 is given in the index of plates but not in the catalogue (the best illustration of this piece, doubtless not available to the author, is plate 59 of *Ancient Art in American Private Collections*, Cambridge, Mass., 1954). D. K. Hill's remarks in *Catalogue of Classical Bronze Sculpture in the Walters Art Gallery*, especially pp. xxi-xxii, supplement the interesting discussion of Samian wasters and the related problem of mechanical reproduction of copies.

Through the reviewer's good fortune in being in Athens, it is possible to present the author with additional data on certain National Museum items of his catalogue (with the untiringly generous cooperation of Mrs. Karouzou). No. 53 (unnumbered) from the Argive Heraion is in Athens and on display. No. 80 (Olympia 806) is Nat.Mus. 6160; No. 87 is Nat. Mus. 11461. There is another unpublished protome from Tsotuli, Macedonia: Nat. Mus. 15205. In view of the author's desire to have all known protomes included in his study, the following additional examples which have come to my attention may be listed. One on the Basle market (*Auction Sale XVI*, June 30, 1956, Classical Antiquities, *Monnaies et Médailles S.A.*, Basle, No. 19, pl. 6) has been assigned by H. Cahn to the sixth group (possibly a misprint or oversight, for it is with the fifth group that all comparisons are made; however, it probably belongs to the sixth group; cf. Jantzen Nos. 116-119). A protome in Oxford has been published by K. R. Maxwell-Hyslop ("Urartian Bronzes in Etruscan Tombs," *Iraq* 18 [1956] pl. xxxii, 1). One of two protomes in private possession is illustrated on plate 60 (No. 199) of *Ancient Art in American Private Collections*. There is an unpublished cast protome (45-2-324) in the University Museum, Philadelphia, with ears, knob and tongue broken off (Jantzen's seventh group). Finally, a recumbent banqueter may be added to the list on p. 101: *ILN*, November 27, 1954, p. 963.

The main features in the development of griffin protomes which emerge from Jantzen's study may be summarized as follows. The prevailing uncertainty about the chronological relationship of the hammered and cast techniques is resolved in the sense that cast examples from Samos are comparable to early (but not quite the earliest) hammered examples, to which Jantzen definitely allows priority. Early examples of both techniques cover the range of the first half of the seventh century B.C. The upper limit is securely

anchored at not later than about 700 B.C. by the position of No. 4 in the Heraion and by the representation of griffin cauldrons on early orientalizing vases. In this context the representation on a Protocorinthian conical oinochoe in New York (G. Richter, *Handbook of the Greek Collection* [1953], pl. 23:a) should also be mentioned; and, perhaps, the Proto-Attic vase found by G. Mylonas at Eleusis (*ILN* November 13, 1954, p. 841; *AJA* [59] 1955, pl. 67:3 and p. 224: notice heads of the Gorgons). An increasing tendency to monumental size resulted in about 650 B.C. in the emergence of a "monumental" group—executed in a combination of the two techniques, in order, as the author explains plausibly against other interpretations, to facilitate technically this very monumentality. In this group the warmer, more "natural" temperament of Samian representations can be most easily contrasted with mainland representations, which are more disciplined. In the second half of the seventh century the impulse to monumentality was transferred to sculpture and the tradition of griffin-protomes—now executed almost exclusively in cast technique—withered slowly, bringing with it reduction in size and plastic impoverishment. The production of protomes is documented longest at Samos where its cessation has a *terminus ante quem* of about 550 B.C.

On the whole, the chronological and typological series of griffin protomes worked out by Jantzen seems convincing to the reviewer. Certain parts of it could be more easily judged if satisfactory photographs of various Olympian examples (Nos. 3, 30, 32, 49, 50 etc.) which are rather important to the argument could have been presented instead of old and inaccurate drawings (see the author's note 3). The publication of the Olympian material mentioned on p. 105 (and in *Gnomon* 28 [1956] 319) can, when it comes, be expected to bring the picture into still sharper focus; in the meantime, it is good to have a tentative view of the whole subject. In fact, the value of Jantzen's carefully considered series emphasizing the clear progression of technique and style is already apparent as a counterbalance to the excessive enthusiasm of K. R. Maxwell-Hyslop (*op.cit.*) for demonstrating the oriental origin of griffin protomes (even the excellent observations on No. 142, the fragmentary protome from Susa, seem not to have impressed her).

In several instances the author might profitably have referred to R. D. Barnett's study of "Early Greek and Oriental Ivories" (*JHS* 68 [1948] 1ff). For example, Barnett's remarks and his plate XI,e already made it seem quite probable that the origin of the griffin knob was the topknot or upper lock of the Near Eastern griffin. It seems unfair to the Greek griffin protome masters to suggest, as does Jantzen (p. 46), that this topknot was "misunderstood." It may well have been the most feasible technical solution to the problem of representing such a feature in bronze. Furtwängler's explanation for the knob (Roscher *s.v. Gryps* 1758; improved on by Ziegler in *RE*) is thus largely deprived of validity if not of interest (cf. also P. Jacobsthal, *Greek Pins* [1956] 40). In Jantzen's otherwise careful study of griffin features, one notices a most singular omission. There is no mention, as far as I can see, of the protuberances, apparently two to five in number, between or slightly above the eyes, which occur fairly regularly in the hammered protomes and are not unknown in the earlier cast protomes. Furtwängler (*Olympia IV*, 119f) referred to these as *spitze Warzen*, Kunze (*2.Ol.Ber.*, 112) called them *spitze Vorsprünge*, but neither suggested an explanation for their presence. It would lead too far to investigate the origin of this feature here. Unfortunately, the best oriental parallel, the gold griffin head from Ziwiye (A. Godard, *Le Trésor de Ziwiyè*, Haarlem 1950, 40, fig. 30) which *does* have warts, cannot be dated. In general, however, oriental griffin representations seem to lack this feature—which is another argument for considering the bronze griffin protomes to be Greek.

Jantzen's approach to style historical problems is stimulating, if not always sufficiently comprehensive. In an attempt to differentiate between Samian and Peloponnesian stylistic character at the apex of the development of griffin protomes, he works out an interesting comparison between the Perugia protomes on plate 21, as representative of eastern style, and the Olympia protome on plate 25, as representative of Peloponnesian style. The play of curves is strengthened in the former case by diagonal axes, in the latter by horizontal-vertical axes. The observation as such is accurate but it may be questioned whether the diagonal axes of the Perugia protomes—resulting from the forward tilting of the knob—are not a casual, or even accidental, feature. In any case, they appear and vanish quickly, even in Samos. The system of horizontal and vertical axes is undoubtedly related to the general "Middle Dedalic" phenomenon of architectonic structure (cf. R. Jenkins, *Dedalica*, 40ff). The three-dimensional, plastic character of the protomes, which should be the essential consideration in a regional differentiation of this sort, tends to be neglected in Jantzen's analysis.

One important contribution to the complicated problems of early orientalizing art emerges from this study. Discussing the origin of the various elements which made up the completely equipped cauldrons on conical stands found in Etruria, he concludes that these are a synthesis of (a) oriental imports—conical stand and cauldron with or without "sirens" or bull attachments—and (b) Greek griffin and lion protomes added by Greek masters (see new evidence on this problem in *Gnomon* 28 [1956] 319). Apparently such a state of affairs seems to some scholars who have recently dealt with the subject too complicated to be probable (see K. R. Maxwell-Hyslop, *op.cit.* 160, and P. Amandry, *The Aegean and the Near East, Studies Presented to Hetty Goldman* [1956] 248, n. 28). Nevertheless, the reasons which Jantzen brings for Greek manufacture of the griffin protomes at least (46ff) seem definitive to the reviewer. Above all, the internal evidence of the logical, unbroken stylistic and typological development

of the protomes, which Jantzen demonstrates throughout, should be emphasized in this context.

This study of griffin protomes is not, and does not claim to be, exhaustive. There is still much to be done in clarifying the origin and deeper meaning, as well as the stylistic history, on a regional basis, of this class of bronzes. There are also related problems such as the history of rod-tripods which need further study. Nevertheless, the author is to be congratulated on an important and timely contribution to the study of Archaic Greek bronzes.

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Le Trésor de Cyrène by *Jean Bousquet*. École Française d'Athènes, Fouilles de Delphes, tome II, topographie et architecture. Pp. 113, figs. 17, pls. 51. E. de Boccard, Paris, 1952.

The Treasury of Cyrene, of which the existence was once regarded by Poulsen as a figment of modern imagination, is now presented as a very concrete fact, a *naos* of Parian marble. It is the fourth of the thirty-two or more treasuries of foreign states at Delphi to appear in the official publication, the available series now being I (the Doric treasury at Marmaria, 1923), II (the Massiliot treasury, 1923), XI (the Athenian treasury, 1933), and XIII (the Cyrenaic treasury, 1952) —employing the Roman numerals with which the reviewer distinguished the successive foundations, and still appearing in the oft-reproduced, albeit revamped, versions of his painfully executed plan of 1912 (cf. fig. 1 of the work under consideration).[1] We still anxiously await in particular III (Sicyon), IV (Siphnos), V (Syracuse ?), VI (Thebes), XII (Cnidos ?), and XVI (Clazomenae ?), though some of the inscriptions and sculptures of these have already appeared in other volumes of the *Fouilles de Delphes*. Meanwhile it is a pleasure to greet a new fascicule, executed with the meticulous care which characterizes the new school of French architectural archaeology since 1910. Every important block is clearly drawn, often on all six faces of the parallelopiped, and carefully measured and photographed, in 11 figures (2-12) and 41 plates (I-VIII, foundation material; IX-XXVIII, XXXIX, the superstructure; XL-LI, photographs). This wealth of documentation enables one, with greater facility than would actual study on the site, to test the accuracy of the architectural restorations (plates XXIX-XXXV) and the mathematical theories (figs. 13-17, plates XXXVI-XXXVIII). And indeed, for reasons to be discussed, such testing almost becomes an obligation.

In the nature of the case, the text falls into three divisions: the site and foundations of Treasury XIII (Ch. I-III), the Cyrenaic superstructure (Ch. IV-V), and Greek mathematics and philosophy (Ch. VI-VII), as well as a brief epigraphical appendix (Ch. VIII) listing and supplementing all previous publications of the inscriptions. The culmination of the whole is the mathematical portion, which is a surprise, apparently as astounding to the author as it is to the reader. The Treasury of Cyrene becomes a Platonic dialogue in living marble. It exemplifies the efforts to solve the most celebrated mathematical problems of antiquity, the discovery of *pi* (3.1415926 . . .), the squaring of a circle, the duplication of a cube, and the trisection of an angle. It embodies the teachings of Theodorus of Cyrene, the friend of Socrates, of Theaetetus the pupil of Socrates, perhaps even of Plato himself. It is because of this literary and philosophical connotation, which would open an entirely new (if acceptable) road to the analysis of Greek architecture, that detailed examination of the results seems unescapable.

First, however, with regard to identity, it may be noted that Treasury XIII epitomizes the chronic problem of Delphian topography, that of combining a given foundation with dislocated portions of an architectural superstructure. The traditional French identification of the marble architectural pieces as Cyrenaic, and their attribution to Treasury XIII, was due to Homolle and Bourguet. At that time the reviewer, while not dissenting with the Cyrenaic identification of the marble pieces, attempted to transfer them to Treasury XIV because certain poros architectural pieces seemed better to fit foundation XIII, suggesting for this the name of Acanthus. Since then, however, it has been generally agreed that the marble pieces should belong to foundation XIII; but Pomtow, after successively calling Treasury XIII either Clazomenian or Massiliot, finally accepted the Acanthian proposal, while Daux termed the combination Syracusan, and even to de la Coste-Messelière it is still "dit de Cyrène."

Bousquet now makes out a very convincing case for the traditional French attribution to Cyrene. Proxeny inscriptions on the walls include five or six for citizens of Cyrene, as against one for a Syracusan, one for a Molossian, one for a Carystian, and one for a citizen of Alexandria Troas (pp. 70, 108). Stylistically the architecture dates from the time when Cyrene was most active at Delphi: the chariot group of Ammon (Pausanias 10.13.5) to which may belong the fourth-century base fragment inscribed [Kυ]PANAIO[ι] (fig. 12, pl. LI; the alternative chariot group of Battos, Pausanias 10.15.6, seems to have been too early); the loan of 10,000 bushels of wheat to Delphi between 330 and 326 (*SEG* IX 1, no. 2; Tod, *Greek Hist. Inscr.* II, no. 196), the *lex cathartica* of Cyrene inscribed on the

[1] The Roman numerals III-XXIII (I-II being in the precinct of Athena Pronaia) still appear as the reviewer had distributed them in *BCH* 36 (1912) pl. VIII. Nos. I-II are now applied to the temple and theater, nos. XXV-XXVI, XXIX, and XXXI-XXXII to foundations shown on the reviewer's plan but not identified as treasuries (for instance, XXVI is the so-called Bouleuterion, XXIX the buried apsidal building). Of those not shown by the reviewer, XXIV (Corinthian) was known to him through a letter from M. Bourguet (*ibid.* 474), but was not shown because the discovery was yet unpublished; and XXVII-XXVIII, XXX and possibly 12, are shadowy foundations not yet visible to the reviewer.

same stone and citing an oracle from Delphi (*SEG* IX 1, no. 72), the contribution of a citizen of Cyrene for the reconstruction of the temple of Apollo in 360 (*FD* III 5, no. 3), and the contributions of five citizens of Cyrene and four from Euhesperis (Bengazi) likewise for the temple about 338-330 (*BCH* 66/67 [1942/43] 99). An interesting parallel is drawn between the almost unique painted metope moulding of the marble series at Delphi and its repetition in the Strategeion at Cyrene, built in the second half of the fourth century (p. 74). It was at this time, too, that the east peribolos wall beside foundation XIII was reconstructed, between 338 and 330 according to the expense accounts, a retaining wall just behind foundation XIII being patched at the same time. It is suggestive that the earliest inscription on the marble pieces dates from the archonship of Megacles (presumably 322/21). And it was in this very region that Pausanias (10.13.6), if we accept the best (but often doubted) manuscript tradition, placed the treasury *τῶν Κυρηναίων* (p. 72). In consequence, and particularly after rectifying the stylobate dimensions to 6.134 x 8.426 m. (see E and F, below) in perfect agreement with the foundations below and the frieze and cornice above, the reviewer is fully persuaded of the correctness of the attribution to Cyrene.

This still leaves open the question of whether foundation XIII was constructed for this marble structure, or was built earlier to support a structure later demolished (presumably a Cyrenaic predecessor), as the retaining wall antedating 338-330 behind it might seem to imply. The reviewer's former doubts as to the suitability of this foundation for the marble architecture (*BCH* 36 [1912] 479-80), so far as they were based on the difference in clamp forms, might have less validity now that we possess several examples with double-T clamps in the lower portions and hook clamps in upper portions of the same buildings (p. 69, n. 1). But the author's assumption of a mere interruption between the two portions of the work, during the Sacred War and the Macedonian invasion (355-338), hardly seems adequate to explain what was apparently a complete poros predecessor of totally different design. Between the lower step *in situ* and the scattered blocks of the upper step (stylobate), though both are of similar hard limestone (the lower more gray, the upper more blue), there are striking differences, not only in the forms of the clamps (double-T in the lower and hook in the upper), but also in the sunken margins at their lower edges, delicately cut margins only 0.005 m. deep but 0.043 m. high on the lower, but more emphatically 0.020 m. deep and only 0.033 m. high on the upper. Again, on the top of the lower step the bed rises 0.005 m. at a distance of 0.505 m. behind the face, providing rather unsteady support for everything above if, as the author restores it, the much broader stylobate is set directly on the lower step. The stylobate blocks, furthermore, show dowel holes on their bottoms corresponding to nothing on the top of the lower step; conversely, on the top of the lower step, there are pry cuttings at regular intervals of 0.86/0.90 m., arranged with complete disregard of the longer stylobate blocks above them. The author attempts to explain these anomalies on the assumption that neither the pry cuttings on the lower course nor the dowel holes in the stylobate blocks were ever employed; but the double contradiction seems clearly to imply that there intervened a missing middle step of which no blocks are preserved. The missing middle step would probably have belonged to the earlier construction with the delicately cut lower margin; the situation would have been exactly parallel to that in the peripteral temple of Apollo at Delos, with a lower and middle step in mid-fifth-century technique surmounted by a Hellenistic stylobate. The pry cuttings on the lower step are so located and so symmetrically arranged as to imply that they were intended for middle step joints centered exactly under triglyphs of a normal six-metope front (instead of the seven metopes of the Cyrenaic marble superstructure). They would agree perfectly with some poros Doric triglyph-metope blocks found in this vicinity (but not discussed in the present work), with a triglyph spacing of 0.89 m., apparently late fifth-century in date, with small double-T clamps in agreement with the foundations and lower step, and with the coloring well preserved as if they had not long been exposed to the weather. The reviewer once assigned them to foundation XIII (*BCH* 36 [1912] 480), while Pomtow afterwards suggested foundation XV, which is far too early. The possibility that these belong to an earlier Cyrenaic treasury erected in poros during the second half of the fifth century (e.g., when Cyrene dedicated the chariot group of Battos by Amphion of Cnossos, in the second generation after Critios; cf. Pausanias 10.15.6), and preceding the marble structure of the following century, deserves further study.

Turning to the marble architecture, the chief subject of the work under review, it may be noted that any analytical investigation of a Greek building should proceed in three successive stages: (I) determination of the exact dimensions (in meters) either by direct measurement or by restoration; (II) transformation of these dimensions into the Greek feet employed for their design; and (III) interpretation of the architect's intentions. In order to check the validity of the author's interpretation (III), therefore, it becomes necessary to revert to the two preceding stages.

I

A few of the more important dimensions must be investigated in detail; the accompanying letters (A-Z) correspond to the Table of Dimensions (in section II), which repeats these dimensions both according to the author and as revised by the reviewer (together with their respective interpretations in Greek feet).

*External width.* In the widths measured on the euthynteria and lower step *in situ*, 6.270 and 6.200 m. (A, C), with a recession of 0.035 m. on all sides, the author's dimensions agree exactly with the reviewer's. Above these, however, the author restores only an upper step (stylobate or toichobate), assuming that it receded by the same amount (0.035 m.) and so yielded

a stylobate width of 6.130 m. (E). Yet one loose block of the lower step (VIII 2) shows on the top a weathered line only 0.028 m. behind the face. If this had been caused by the sunken bottom margin of the stylobate (0.020 m. deep, average of seven measurements 0.019/0.022 m.), the stylobate face would have been only 0.008 m. behind that of the bottom step, giving a width of 6.184 m. But if the line were really an engraved line it might, on the analogy of that for the belt course on the orthostates (see below), have coincided with the stylobate face, the recession of 0.028 m. then giving a width of 6.144 m. In neither case would it have been 6.130 m. Furthermore, if we restore a missing middle step (see above), its face would presumably have been 0.028 — 0.005 = 0.023 m. behind that of the lower (total width 6.154 m.). If the stylobate receded by the same amount of 0.023 m., the total width would have been 6.108 m. and so deficient, as will be shown, with respect to the frieze. But if the lower margin of the stylobate were set 0.028 m. behind the face of the middle step, the stylobate face would be 0.028 — 0.020 = 0.008 m. behind, giving a total width of 6.138 m.

The width measured across the anta corners is given by the author as 5.940 m. (G), obtained by receding 0.095 m. from the stylobate of 6.130 m. A setting line 0.101 m. behind the face on the flank stylobate blocks (average of four measurements 0.098/0.104 m.; but 0.008 m. less on the rear as given by a raised bed 0.093 m. behind, average of three measurements 0.092/0.095 m.) locates the flank orthostate faces. On the tops of the orthostates in turn are engraved lines 0.015 m. behind the face (average of four measurements 0.012/0.017 m.), evidently corresponding, as the author rightly believes, to the wall plane itself rather than to the sunken bottom margin 0.0075 m. deep on the belt course (average of five measurements 0.007/0.008 m.). Thus the anta faces, 0.0205 m. outside the wall plane (average of seventeen measurements 0.016/0.023 m.), were 0.0205 — 0.015 = 0.0055 m. outside the orthostates. The anta corners, therefore, should be 0.101 — 0.0055 = 0.0955 m. behind the flank stylobate face. The total width across the anta corners might be 6.108 — (2 x 0.0955) = 5.917 m. or preferably 6.138 — (2 x 0.0955) = 5.937 m., the latter almost identical with that given by the author.

In conformity with the assumed width of 5.940 m., the author restores the triglyph frieze on the front with eight triglyphs of 0.320 m., two endmost metopes of 0.520 m., a central metope of 0.4826 m., and four normal metopes of 0.464 m. (total 5.9386 m.), with a disconcerting rhythm of wide (endmost), narrow, medium (central), narrow, and wide (endmost). On the rear he restores a regular system of eight triglyphs of 0.321 m. and seven metopes of 0.4826 m. (total 5.9462 m.). Among the extant frieze blocks, he perceived that one of exceptional length, M + T + M + T + M (XXII 2), would have appropriately relieved the weight above the long central architrave on the front; but since it would not fit his metope rhythm he placed it on the solid rear wall where it could serve no structural purpose. For the vacated central position on the front he restored to similar length an incomplete piece (XXII 8) which seems more appropriate for a flank. To the endmost right position on the front he assigned the metope 0.520 m. long (XXII 1), which however has a dowel hole on its top contradicting the proper jointing of the corner cornice.[2] For these reasons it becomes necessary to revise the front system.

Distinguishing the flat-topped front cornice blocks from those with sloping tops on the flanks, it is evident that four measurable front mutules (on XXIII 1, XXIV 5, 7; 0.322/0.323 m., total 1.291 m.) together with four corresponding triglyph widths (XXII 2, 4, 6; 0.320/0.323 m., total 1.287 m.) yield a general average of 8 x 0.3223 = 2.578 m. Again, four front mutule spacings on the same three cornice blocks (0.399/0.401 m., total 1.600 m.) together with three front triglyphs with their attached metopes (XXII 2, 4; 0.806/0.807 m., total 2.419 m.) yield an average mutule spacing of 10 x 0.4019 = 4.019 m., or a triglyph spacing of 5 x 0.8038 = 4.019 m. Thus the theoretical metope width would be 0.8038 — 0.3223 = 0.4815 m., corresponding to three actual metopes of 0.483/0.485 m. (on XXII 2, 4). Theoretically, therefore, one might estimate the front width as (8 x 0.3223) + (7 x 0.4815) = 5.949 m.

For the front width, therefore, we may adopt the mean between the two results 5.937/5.949 m., that is, 5.943 m., practically identical with the author's result. The difference, however, occurs in the frieze, which now has a regular triglyph spacing of 0.803 m.; for 0.322 + 0.481 = 0.803 m., and (8 x 0.322) + (7 x 0.481) = 5.943 m. The width across the anta corners being the same as that on the frieze, the width on the stylobate was 2 x 0.0955 m. greater, or 6.134 m. The recession of the stylobate from the bottom step, measured as 6.200 m., was therefore ½ (6.200 — 6.134) = 0.033 m., including 0.023 m. for the middle step and so 0.010 m. for the stylobate.

*External length.* The total length from the euthynteria at the rear to the topmost existing foundation course on the front, three courses lower, is given by the author as 8.646 m. (p. 52), closely corresponding to 8.62 m. in the reviewer's old notebook. But the author assumes that, in contrast to the recessions on the other sides, all the missing courses (including the euthynteria) were exactly flush on the front, thus giving 8.646 m. also for the euthynteria itself (B). If, however, with greater probability we allow a recession of at least 0.02 m. for each missing course on the front, we should have about 8.62 — 0.06 = 8.56 m. on the euthynteria.

With 8.646 m. on the euthynteria, the author allows for a recession of 0.035 m. at front and back, as on either side, and thus obtains 8.576 m. for the length on the bottom step (D); with a similar recession of 0.035 m., the stylobate length is estimated as 8.506 m.

[2] See note 3.

(F). Then, allowing 0.095 m. for the recession to the antae, the total length across the anta corners would become 8.316 m. (H). But if we reduce the euthynteria length to about 8.56 m., and so that of the bottom step to about 8.49 m., that of the middle step would become 8.49 — (2 x 0.023) = 8.444 m., and that of the stylobate 8.444 — (2 x 0.010) = 8.424 m. We may infer that the recession of the front antae was 0.0955 m. as on the flanks, but 0.008 m. less or 0.0875 m. on the rear; then the total length across the anta corners should be about 8.424—(0.0955+0.0875)=8.241 m.

Since the exact length of the euthynteria is uncertain, however, the author bases the foregoing lengths primarily on the triglyph frieze, restoring eleven triglyphs of 0.317 m. and ten metopes of 0.4826 m., the resulting total being enlarged by 0.003 m. to fit the assumed foot unit, 28 x 0.297 = 8.316 m. (H). Such metopes could, to be sure, agree with three existing metopes averaging 0.484 m.; but these, as we have seen, fit the front cornice. On the flank cornice blocks with sloping tops, seven measurable mutules (on XXIII 1-2, 4-5, XXIV 2-3; 0.316/0.321 m., total 2.222 m.), together with two corresponding triglyphs (XXII 5-6; 0.317/0.318 m., total 0.635 m.), yield a general average of 9 x 0.3174 = 2.857 m. Again, eight flank mutule spacings on the same six cornice blocks (0.388/0.395 m., total 3.121 m.) yield an average mutule spacing of 0.3901 m. and so a triglyph spacing of 0.7802 m. Thus the theoretical metope width would be 0.7802 — 0.3174 = 0.4628 m. This agrees with an existing metope of 0.464 m. cut on the same block with a triglyph and part of another metope (XXII 8); the author restores it as a M + T + M [+ T + M] block, set at the middle of the front to counterbalance the block (XXII 2) which he places at the middle on the rear; but the latter would be preferable on the front, as we have seen, while the former could equally well be restored as M + T + M or even as M + T + M [+ T], the top being too broken to show the position of the central lewis hole. The width of the triglyph (0.321 m.) is equivocal; while it might seem appropriate for the front, one of the flank mutules (on XXIII 4) shows this same width. Because of the metope width, now excluded from the fronts, it seems preferable to restore this as a M + T + M block at the middle of a flank. Including this, our average for the flank triglyph width now becomes 10 x 0.3178 = 3.178 m. And, including the triglyph spacing of 0.464 + 0.321 = 0.785 m. on this central block (XXII 8), we obtain an average of 10 x 0.3906 = 3.906 m. for the mutule spacings and so of 5 x 0.7812 = 3.906 m. for the triglyph spacings (cf. 0.782 m. in the reviewer's note, *BCH* 36 [1912] 480 n. 1), the theoretical metope width becoming 0.7812 — 0.3178 = 0.4634 m. There is no evidence whatever for the author's flank triglyph spacing of 0.317 + 0.4826 = 0.7996 m.

The flank triglyph spacing of 0.7812 m. is corroborated by the sima immediately above, presented by the author (pls. XXXIII-XXXIV) as discordant with the triglyph frieze. For the broken sima fragments with lion-head spouts centered ca. 0.26/0.265 m. from the joints, as nearly as measurement to the rough openings will permit (XXV 5-6), are restored by the author as 0.520 in length, but strangely with open gaps of 0.0035 m. at each joint (p. 58). Simple outlets appear on other simas (XXV 13), necessarily either in single or double alternation with the lion-heads; the author adopts single alternation, with the lion-heads spaced 2 x 0.5235 = 1.047 m. on centers, with the result that only the central one has any reasonable relation to his triglyphs spaced 0.7996 m. on centers. But with double alternation, eliminating the unprecedented "gaps" and making the sima length 0.521 instead of 0.520 m. (equally possible in view of the rough measurements), we obtain a lion-head spacing of 3 x 0.5208 = 1.5624 m., coinciding exactly with alternate triglyphs (2 x 0.7812 = 1.5624 m.). The fact that the sima is in perfect accord corroborates our spacing of the flank triglyphs.

There is also one other metope to be considered, that of 0.520 m. (XXII 1), assigned by the author to the right corner on the front. It would require in the cornice above it viae averaging ½ (0.520 — 0.322) = 0.099 m. if on a front, or ½ (0.520 — 0.318) = 0.101 m. if on a flank. But nowhere, either from front or flank, do we find any actual example of a via as wide as 0.099/0.101 m.; the widest actually preserved are 0.078 m. For technical reasons we may definitely exclude this metope from either front or rear, where, furthermore, it and a companion metope would increase the width far beyond the allowable limit. And, after lengthy trial, it becomes evident that the only possible position is at the left end of the east flank.[3] Including

[3] This metope of 0.520 m. (XXII 1), with a joint at the right and a portion of attached triglyph at the left, presents the most difficult problem in the entire reconstruction. Being excluded from a conceivable front central position by the long central block (XXII 2 or its counterpart), the author rightly assigned it to an endmost position. On either front or rear, this would necessarily be a right end position, the piece of triglyph at the left precluding a left end position where a joint would have been required by the corner frieze jointing (cf. XXII 6). But the right end position on the rear is excluded by the existing corner cornice blocks, of which one marked OIII (*σθεν*) came from the left or northeast corner (XXIII 1), though its counterpart is too broken to exhibit such letters (XXIII 2); the former is sufficiently preserved to show that the via between the cornermost mutules was only 0.077 m. instead of the required 0.099 m., and its symmetrical counterpart would have excluded the wide metope from the rear. Thus the author selected the right end position on the south front by elimination. But from this also it must be excluded because a dowel hole on the top of the metope (XXII 1) would require a cornice joint only one via beyond the endmost mutule (0.322 + 0.099 = 0.421 m. from the corner of the bed), as shown on pl. XXXI, controverting the proper corner joint alternation in architrave, frieze, and cornice, and very inadequately supporting the thrust of the raking cornice (contrast the rear, pl. XXXII, where the corner cornice jointing is properly restored on the basis of XXIII 1-2). Because of the physical requirements, therefore, as well as the triglyph spacing, the wide metope must be eliminated from the front as well as the rear, and so relegated to an endmost position on a flank. But here the frieze jointing shows that it could not have adjoined a right corner triglyph, which was cut in the same stone with the endmost

this and its companion as widened terminal metopes, the total length of the flank frieze now becomes (11 x 0.3178) + (8 x 0.4634) + (2 x 0.520) = 8.243 m.

The total lengths may now be recalculated on the basis of that of the frieze, 8.243 m. Since the frieze and architrave were flush with the anta faces, the length across the anta corners was identical, making the stylobate length 0.0955 + 0.0875 m. greater, or 8.426 m. The length on the bottom step, 0.033 m. greater at both ends, becomes 8.492 m.; and, allowing 0.035 m. at both ends for the euthynteria projection, the total becomes 8.562 m. (previously estimated 8.56 m.).

*Column spacings and heights.* The lower and upper column diameters, 0.557 m. (J) and 0.456 m. (K) may be taken as given by the author. But the central column spacing, given as 2.371 m. (I), is subject to correction. Since the architrave joints bisect the regulae below the triglyphs, the new arrangement of the front frieze shows that the central spacing would have been 3 x 0.803 = 2.409 m., and so 0.038 m. greater than the author's dimension.

With respect to the column height which, because of the fragmentary condition of the column drums, must be taken from the enframing walls, the author gives two versions, 0.848 + 0.320 + (8 x 0.297) + 0.320 = 3.864 m. (p. 48) and 0.846 + 0.318 + (8 x 0.297) + 0.321 = 3.861 m. (pl. xxxv). The orthostates average 0.847 m. (four measured heights 0.845/0.850 m.), the belt course "à ciselure" above them 0.318 m. (seventeen measured heights 0.315/0.321 m., cf. p. 39 n. 2), and the course aligning with the anta capitals 0.3195 m. (three measured heights 0.318/0.3205 m.). As for the intermediate courses, the author clearly demonstrates by his analysis of the bonding at the corners that there were eight; but he states (p. 40) that among the ninety blocks with measurable course heights (0.288/0.306 m.) the average is 0.297 m., whence the use of 8 x 0.297 m. in the restoration. The twenty-seven that are illustrated, however, ranging from 0.292 to 0.307 m., average 0.29889 m.; and this slight increase seems to be justified by the fact that while one of the two possible restorations of the wall coursing gives an average height of 0.29879 m. for seven known courses, the other and preferable restoration gives an average of 0.29921 m. for seven courses, one course unknown in either case.[4] With the latter, we obtain the wall (and column) height as 0.847 + 0.318 + 2.3935 + 0.3195 = 3.878 m.

We may prefer the author's entablature height of 1.116 m. (p. 59) to that of 1.107 m. (pl. xxxv, taken only to the top of the cornice moulding). The architrave height being 0.4308 m. (average of five pieces 0.429/0.433 m.), the frieze height 0.5262 m. (mean of two measurements 0.526/0.5265 m.), and the cornice height 0.160 m. (average of three measurements 0.159/0.161 m.), the total becomes 1.117 m. (M). To obtain the total façade height above the stylobate, given by the author as 5.940 m. (N), we note that the cornice projection from the triglyph face is 0.009 + 0.268 + 0.26 = 0.303 m. (pl. xxii), the total width across the cornice becoming 5.943 + (2 x 0.303) = 6.549 m. The slope of the pediment is stated to be 1 : 4 (pp. 56-57); assuming that it was such, the pediment height to the apex of the raking cornice becomes 0.819 m. and, adding 0.147 m. for the apex sima (p. 59), the pediment height would be 0.966 m. The combined height of entablature and pediment becomes 1.117 + 0.966 = 2.083 m. (corresponding to the author's 2.081 m.); and the total height including the column becomes 3.878 + 2.083 = 5.961 m. (N).[5]

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metope (cf. XXII 6); thus it is limited to a left end position. Since, moreover, the two extant corner cornice blocks (XXIII 1-2) were evidently counterparts, the fact that their flank returns extend only one via (0.071/0.072 m.) beyond the endmost mutule and so 0.388 m. from the corner of the bed in both cases, in contrast to that 0.736 m. (0.317 + 0.520 − 0.101 m.) from the corner as required by the dowel hole on the wide metope, would eliminate this metope from the left end position on the west flank. There remains only one available position in the building, at the left end of the east flank, the adhering bit of triglyph having been part of the southeast corner triglyph. The front corner cornice blocks would thus have returned on the flanks to the extent of one mutule more than at the rear corners (0.317 + 0.520 − 0.101 = 0.736 m.), the jointing asymmetry in the flanks being unimportant. More disturbing is the fact that at the rear corners the cornice returns of only 0.388 m. would not allow for a similarly widened via of 0.101 m., as required for symmetry; presumably the via of only 0.071/0.072 m. on these was cut in accordance with the normal flank width, the extra 0.029/0.030 m. then being cut on the adjoining cornice block, just as one of the front cornice blocks (XXIV 7) has 0.005 m. of extra via at its left end. In other words, we must allow for a certain amount of miscalculation in the jointing.

[4] Six existing rear corner blocks can be assigned to six separate courses by the alternation of bonding, and also three front anta blocks have the additional evidence of the tapering engaged columns and in one case (XVIII 5) the mason's number E (four courses above the belt course, XVII 3 marked A). The author notes (pp. 43-44) that, taking all evidence into consideration, there are two possible sequences for eight courses, the corner blocks from bottom to top being as follows: either (A) XVI 6 (with XVIII 2), missing, XVI 4, XVI 2 (with XVIII 5 = E), XVI 5, XVI 1, XVI 7, missing (with XVIII 1), or (B) XVI 4 (with XVIII 2), XVI 2, XVI 5, XVI 1 (with XVIII 5 = E), XVI 7, missing, XVI 6, missing (with XVIII 1). Substituting the measured heights for each, we have (A) 0.2995 (0.298/0.301) missing, 0.300, 0.297 (0.294/0.300), 0.304, 0.292, 0.307, 0.292 m.; or (B) 0.3005 (0.300/0.301), 0.300, 0.304, 0.293 (0.292/0.294), 0.307, missing, 0.298, 0.292 m. The former (A), that adopted by the author (pp. 44, 64), has a total of 2.091- m. lacking one course, the average of 0.29879 m. suggesting 2.3903 m. for eight courses. The latter (B), which seems preferable because of the smaller discrepancies between the blocks thereby assigned to the first and fourth courses, has a total of 2.0945 m. lacking one course, the average of 0.29921 m. suggesting 2.3937 m. for the eight courses.

[5] The dimensions 0.965 m. and 6.831 m. at the right edge of pl. xxxv should extend to the top of the sima, not merely to the apex of the pediment cornice. On the top of one front cornice block (XXIV 8) is a dowel hole for a joint in the face of the tympanum, but, as placed in the restoration (pl. xxxii), this has no possible relation to the jointing of the tympanum (fig. 5, pls. xxxi-xxxii).

*Internal dimensions.* The internal width of the cella (and pronaos), given by the author as 5.049 m. (S), is determined by the fact that the inner faces of the walls (usually destroyed by fire) were 0.443 m. (average of four measurements 0.441/0.444 m.) from the anta faces (R). Thus the internal width was 5.943 — (2 x 0.443) = 5.057 m. (S).

For the lengths, in the absence of intelligible traces of the cross-wall foundation, the author is limited to an anathyrosis joint on the inner face of a flank block of the belt course (XIII 5), by which, he says, "we can determine its place exactly: it formed a cella exactly square on the interior, 5.049 = 17 feet" (pp. 39, 64). It is difficult to see how this can be so exactly decided. The anathyrosis joint, measured as 0.50 m. wide at present, has been partly damaged, the width once having been greater. The author gives the thickness of the cross-wall as 0.575 m. (pp. 37, 38, 61, figs. 9-10, pl. XXVIII 6); but this is measured along the oblique joint, and in accordance with the angle of obliquity the true thickness should be calculated as 0.572 m. (V). But it is very difficult to locate the decisive flank block exactly, the jointing of the flank walls being unknown and apparently irregular. The best that can be done under the circumstances is to regard the pronaos depth as 2.219/2.248 m. (U).[6] Since the inner face of the rear wall was 0.443 m. from the anta faces (R), there would be a length of 8.243 — (0.443 + 0.572) = 7.228 m. to be shared by pronaos and cella, the length remaining for the latter being only 4.980/5.009 m. (W), and so 0.048/0.077 m. less than the width. Certainly the cella was by no means exactly square.

The doorway height in the clear is given by the completely preserved right-hand door jamb as 2.155 m. (X). The total height including the threshold was calculated by placing the top of the door jamb (= lintel soffit) on a course line, located by system A of the wall coursing as 3.861 — 1.516 = 2.345 m. above the stylobate (Y). With the revised column height, and employing the preferable system B, this dimension would be 3.878 — 1.516 = 2.362 m. And the height of the missing threshold would be 0.207 m. instead of the author's 0.190 m.

The clear width of the doorway is estimated as 1.260 m. at the back, 1.318 m. (Z) at the splayed front, and 1.820 m. across the jambs. These dimensions are based on the arbitrary assumption that the total width was equal to the clear interval between the front columns, given as 2.376 — 0.556 = 1.820 m. (elsewhere as 2.371 — 0.557 = 1.814 m.). But we have seen that the clear interval between the columns would have been 2.409 — 0.557 = 1.852 m.; and in any case such a relation to the front intercolumniation does not seem convincing. It would have been preferable to have studied the "axis of symmetry" in the spacing of the richly diversified ornament on the three pieces of "frieze" above the lintel (XXVIII 1-3), of which one was at the left corner according to the angle palmette, another at the middle according to the lewis hole on the top. For the different spacings of the egg-and-dart (0.0975 m.), heart-and-dart (0.0795 m.), guilloche (0.0185 m.), Doric leaves (0.0535 m.), and bead-and-reel (0.0305 m.)—if we can trust the dimensions scaled from the detailed drawing—might, with further study, yield an accurate solution.

Among the twenty-six important dimensions tabulated below, therefore, it seems necessary to make minor but significant changes in eleven (B, D, E, G, L, N, S, T, U, V, Y) and more considerable changes in four (F, H, I, W), while for one (Z), on which the author lays stress, there seems to be no available evidence.

## II

For the interpretation of these dimensions the identity of the Greek foot becomes important. French scholars have long been addicted to a Greek foot unit of 0.296/0.297 m., or even 0.2978 or 0.2985 m. (e.g., Dugas and Clemmensen at Tegea, Courby at Delos, Audiat, de la Coste-Messelière, and Chamoux at Delphi). So also Bousquet finds exact multiples of 0.297 m. in seven dimensions (G, H, I, L, N, S, W), all of which seem to require revision, three of them (H, I, W) considerably; he also employs exactly 0.297 m. for all eight wall courses, which would seem to have averaged 0.2992 m. The reviewer believes, moreover, that such a foot unit is dubious on two grounds. First, its modern paternity. It started with Dörpfeld's theory of 1882 that the Greek and Roman (ca. 0.295 m.) foot were identical, and with his deduction of such a foot, slightly enlarged to 0.2957 m., in the Parthenon and other Athenian buildings. This foot of 0.2957 m. has survived in several textbooks and works of reference, though Dörpfeld himself abandoned it in 1890 as completely fallacious. It has grown still more, to 0.297 m. or even more, in several recent publications. Second, its ancient affiliations. As noted, it is close to the Roman foot; but its ancestry, if it were authentic, would have been not Rome but Ionic Asia Minor.

[6] The block of the belt course in question (XIII 5) is 1.011 m. long; two flank orthostates are 1.067 and 1.152 m. long. In the odd-numbered courses above the orthostates, including the belt course, the front corners had long blocks of 0.970 m. (XVIII 5) while the rear corners had short blocks of the anta width 0.443 m.; the intervening distance of 6.830 m. would accommodate six blocks of 1.1383 m. or seven of 0.9757 m. In the even-numbered courses the situation was reversed; the front corners had short blocks of the anta width 0.460 m., while the rear corners had long blocks averaging 0.8467 m. (three of 0.845/0.849 m.); the intervening distance of 6.936 m. would accommodate six blocks of 1.156 m. or seven of 0.991 m. Assuming that the front anta block in this belt course had the normal length 0.970 m., the next block on the left flank (presumably XIII 2 with three additional fragments) can be restored on epigraphical grounds to a length of about 1.15 m., and the third block would have been that with the anathyrosis joint on the inner face (XIII 5), the distance from its end nearer the front to the middle of the cross-wall anathyrosis being about 0.385 m. (as scaled on pl. XIII). Estimating about 0.970 + 1.15 + 0.385 = 2.505 m. from the front anta face to the middle of the cross-wall, and deducting half of the cross-wall thickness of 0.572 m., the pronaos depth would be about 2.219 m., though the author seems to have estimated about 2.248 m. (i.e., 8.316 — [0.444 + 5.059 + 0.575] = 2.248 m.).

There, however, the true Ionic foot was appreciably shorter, 0.2935/0.2943 m. It is true that, by the time it reached Rome, the Ionic foot had increased slightly to ca. 0.295 m.; but it would hardly have swollen momentarily to 0.297/0.2985 m. while passing across the Greek mainland. Furthermore, while an Ionic foot might have been employed on the Greek mainland by builders from an Ionic state, it is hardly likely that Cyrene, with its Doric traditions, and with its Doric weight and coinage systems affiliated to those of Corinth and Athens, would have insisted upon the use of an Asia Minor Ionic foot for a building in Greece proper. It is rather the Doric foot of about 0.326/0.3272 m. that we should expect to find in the Cyrenaic treasury at Delphi.

Since the column spacing was one of the key dimensions in a Greek building, usually expressed in fairly simple terms and usually most accurately laid out (though in this case no setting lines are preserved on the surviving stylobate blocks), the reasonable approach is to test the axial spacing 2.409 m. (I) with reference to the bracket 0.326/0.3272 m. It appears that this would be 7 ⅝ Doric feet of about 0.32664 m., the triglyph spacing being 2 $^{11}/_{24}$ feet on the front and one dactyl less or 2 $^{19}/_{48}$ feet on the flank. Testing all the other dimensions in the same way, we finally build up to the longest trustworthy dimensions, 5.943 m. = 18 $^{5}/_{24}$ feet (G) and 8.243 m. = 25 ¼ feet (H) measured across the anta corners, and so to 6.200 m. = 19 feet (C) and 8.492 m. = 26 feet (D) on the bottom step. Adding the last, we have half of the periphery of the building as 14.692 m. = 45 feet, yielding a foot unit of 0.32649 m.

Both the author's interpretations and the reviewer's are set forth in the following Table of Dimensions, each in conjunction with the published or rectified dimension to which it applies; and little further comment seems necessary. Only in the case of the length of the cella, within the allowable bracket of 4.980/5.009 m., the length 5.005 m. may be suggested as the only simple dimension (15 ⅓ feet) within this bracket, the depth of the pronaos being adjusted accordingly (U, W).

## III

The foregoing examination of the metric measurements and of their equivalents in Greek feet has been preparatory to notice of the culminating portion of the book, the mathematical analysis which attempts to open new paths in so many unorthodox directions.

The author has transformed most of the dimensions not merely into Greek feet of 0.297 m. but also into dactyls of 0.0185625 m., thereby accumulating a multitude of numbers among which some are selected as of intrinsic interest. As thus expressed in dactyls, he discerns (pp. 67-68, 77) a tendency to employ square numbers, 81 ($9^2$, lateral axial spacing), 100 ($10^2$, assumed length of unknown door threshold, pl. XXXVIII), and

### TABLE OF DIMENSIONS

| | AUTHOR | | | REVIEWER | | |
|---|---|---|---|---|---|---|
| | *Measured* | *Designed* | | *Measured* | *Designed* | |
| | *meters* | *feet* | *meters* | *meters* | *feet* | *meters* |
| (A) Euthynteria width | 6.270 = | 21 $^{7}/_{24}$ | (6.2695) | 6.270 = | 19 $^{5}/_{24}$ | (6.2715) |
| (B) Euthynteria length | 8.646 = | 29 $^{7}/_{24}$ | (8.6455) | 8.562 = | 26 $^{5}/_{24}$ | (8.5565) |
| (C) Bottom step width | 6.200 = | 20 $^{111}/_{128}$ | (6.1975) | 6.200 = | 19 | (6.2035) |
| (D) Bottom step length | 8.576 = | 28 $^{111}/_{128}$ | (8.5735) | 8.492 = | 26 | (8.4885) |
| (E) Stylobate width | 6.130 = | 20 ⅝ | (6.1255) | 6.134 = | 18 $^{19}/_{24}$ | (6.1355) |
| (F) Stylobate length | 8.506 = | 28 ⅝ | (8.5015) | 8.426 = | 25 $^{19}/_{24}$ | (8.4205) |
| (G) Width to anta corners | 5.940 = | 20 | (5.940) | 5.943 = | 18 $^{5}/_{24}$ | (5.945) |
| (H) Length to anta corners | 8.316 = | 28 | (8.316) | 8.243 = | 25 ¼ | (8.244) |
| (I) Central axial spacing | 2.371 = | 8 | (2.376) | 2.409 = | 7 ⅜ | (2.408) |
| (J) Lower column diameter | 0.557 = | 1 ⅞ | (0.557) | 0.557 = | 1 $^{17}/_{24}$ | (0.558) |
| (K) Upper column diameter | 0.456 = | 1 $^{17}/_{32}$ | (0.455) | 0.456 = | 1 $^{19}/_{48}$ | (0.4555) |
| (L) Column height | 3.864 = | 13 | (3.861) | 3.878 = | 11 ⅞ | (3.877) |
| (M) Entablature height | 1.116 = | 3 ¾ | (1.114) | 1.117 = | 3 $^{5}/_{12}$ | (1.1155) |
| (N) Total front height | 5.940 = | 20 | (5.940) | 5.961 = | 18 ¼ | (5.9585) |
| (O) Wall thickness | 0.424 | | | 0.4225 = | 1 $^{7}/_{24}$ | (0.4215) |
| (P) Orthostate thickness | 0.427 = | 1 $^{7}/_{16}$ | (0.427) | 0.428 = | 1 $^{5}/_{16}$ | (0.4285) |
| (Q) Anta offset from wall | 0.019 = | 0 $^{1}/_{16}$ | (0.0185) | 0.0205 = | 0 $^{1}/_{16}$ | (0.0205) |
| (R) Anta corner to inner face of wall | 0.444 = | 1 ½ | (0.4455) | 0.443 = | 1 $^{17}/_{48}$ | (0.442) |
| (S) Cella, inner width | 5.049 = | 17 | (5.049) | 5.057 = | 15 ½ | (5.0605) |
| (T) Pronaos, depth from stylobate face | 2.341 = | 7 ⅞ | (2.339) | ca. 2.318 = | 7 $^{5}/_{48}$ | (2.3195) |
| (U) Pronaos, depth from anta face | 2.246 = | 7 $^{9}/_{16}$ | (2.246) | ca. 2.223 = | 6 $^{13}/_{16}$ | (2.224) |
| (V) Cross-wall thickness | 0.575 = | 1 $^{15}/_{16}$ | (0.5755) | 0.572 = | 1 ¾ | (0.5715) |
| (W) Cella, inner length | 5.049 = | 17 | (5.049) | ca. 5.005 = | 15 ⅓ | (5.006) |
| (X) Doorway height | 2.155 = | 7 ¼ | (2.153) | 2.155 = | 6 $^{29}/_{48}$ | (2.156) |
| (Y) Id., with threshold | 2.345 = | 7 ⅞ | (2.339) | 2.362 = | 7 $^{11}/_{48}$ | (2.360) |
| (Z) Doorway width, front | 1.318 = | 4 $^{7}/_{16}$ | (1.318) | ? | ? | |

121 ($11^2$, pronaos depth U), and also double squares such as 98 ($2 \times 7^2$, central intercolumniation), 128 ($2 \times 8^2$, central axial spacing), and 162 ($2 \times 9^2$, sum of two lateral axial spacings). But these are obviously meaningless unless one accepts the hypothetical foot of 0.297 m.; and, furthermore, it so happens that every one of the dimensions in question either requires correction (axial spacings) or is unknown (door threshold length, pronaos depth).

The proportions deduced by the author are of two kinds, traditional ratios of simple numbers ("static symmetry") and ratios of irrational numbers ("dynamic symmetry"); for "in the working drawings of the treasury 'static symmetry' and 'dynamic symmetry' were bonded together" (p. 91). This system, so far as it concerns irrational numbers, is presented as the creation of Theodorus of Cyrene. For did not Theodorus tell Socrates and his young pupil Theaetetus that he had worked out the square roots of numbers up to 17, and also the corresponding cube roots (Plato, *Theaetetus*, 147d-148b)? "On this celebrated passage in the *Theaetetus* the Delphian treasury forms a commentary, unexpected but now certain and detailed" (p. 89). "The treasury is a purely intellectual offering to the God of Delphi, addressed to pure intelligence and without a shadow of mystical intention" (p. 104).

Let us first examine the "static symmetry." Scattered through the text one encounters twenty-six assumed linear proportions,[7] fitting fourteen ratios between 1 : 1 and 1 : 12. All depend largely for their plausibility upon the interpretation in Greek feet of 0.297 m. Apart from this interpretation, it is evident that in two cases the ratio (5 : 7) depends upon an exaggerated total length (H). "The simplicity of these relations (G : H and N : H) is in my eyes the best guarantee of the exactitude of the calculations" (p. 59). But the fact that these ratios present discrepancies of 0.077/0.1025 m. would seem to dispose of the use of Plato's "nuptial number" (*Republic*, 546b-c) with 7 as the "rational diagonal" of 5 (p. 90). One more ratio (1 : 1 for S : W) depends on the assumption of a square cella, of which the length seems to have been deficient by about 0.052 m., and two others (1 : 1 for T : Y and 4 : 9 for T or Y : S) upon dimensions for doorway height (Y), pronaos depth (T), and interval pronaos width (S), which when corrected yield discrepancies of 0.045 and 0.070/0.115 m., respectively. Two others (3 : 4 for ½ [G — I] : I and 2 : 5 for I : G) depend on a deficient central axial spacing (I), yielding discrepancies of 0.042 and 0.230 m., respectively. And four others depend on the completely unknown width of the doorway (Z) and so may be dismissed. In other instances the discrepancies would not be so great, but the results are equally nebulous. In short, not one of the twenty-six proposed "static" proportions is convincing, and in most cases they are impossible.

Turning to the "dynamic symmetry," the author notes that the square roots of the following numbers (besides 4, 9, 16, 25, etc.) have the figures 0 or 9 in the third decimal place: 6, 22, 24, etc. And the same is true of the cube roots of the following numbers (besides 8, 27): 2, 5, 9, 12, 14, 16, 18, etc. These, then, may be multiplied by 10 or even by 100 to yield integral numbers without appreciable discrepancies. To obtain these integral numbers, again, the author transforms the dimensions not into feet of 0.297 m. but into dactyls of 0.0185625 m. In this way he interprets the front triglyph width and the heights of the belt and capital courses of the walls as 17 ⅛ dactyls $= 10\sqrt{3} =$ 17.320508 (pp. 88, 90 n. 3), the upper column diameter (K) as 24 ½ dactyls $= 10\sqrt{6} =$ 24.494897 (p. 80), the lower column diameter (J) as 30 dactyls $= 10\sqrt{9} =$ 30.000000 (p. 79), the doorway height (Y) and the pronaos depth from the stylobate (T) and the distance of the door opening from the lateral anta face as 126 dactyls $= 100\sqrt[3]{2} =$ 125.992105 (pp. 87-88), and the column height (L) as 208 dactyls $= 100\sqrt[3]{9} =$ 208.008380 (pp. 78-79). These stand or fall with the accuracy of the dimensions (requiring correction in the case of L, T, and Y, while the distance from doorway to lateral anta face is unknown) and with their translation into Greek feet of 0.297 m. (which may be rejected). In the case of the numerical relationships to square or cube roots, therefore, the theory does not sustain examination.

The theory of cubic or irrational ratios began when the author picked up his slide rule (p. 78) in order to compare 208 with 30 dactyls (the Greek equivalents into which he had transformed the column height and lower diameter), and found to his surprise that 9 appeared simultaneously not only as the square of 3 but also as the cube of 2.08 (literally, $2.08^3 = 8.998912$ or $\sqrt[3]{9} =$ 2.080084, discrepancies which could be disregarded). Thus, instead of assuming that the column height was intended to be $208 = 6\,\frac{1}{16} \times 30$ ($6\,\frac{1}{16}$ lower diameters) in an orthodox manner, he inferred that both dimensions were designed as roots of 9 and thus bore an intimate relationship, expressed as $10\sqrt{9} : 100\sqrt[3]{9} = 30 : 208.008380$, the column height thus being 6.933612 lower diameters. [It is more probable that the height of 11 ⅞ feet (L) was intended to be 1/12 foot less than 7 diameters of 1 13/14 feet as noted below.] The ratio $\sqrt{2} : \sqrt{3} =$ 1.414213 : 1.732050 = 1 : 1.224745, also expressed as $\sqrt{\frac{2}{3}} : 1 =$ 0.816496 : 1, between the architrave and frieze heights of 0.4308 and 0.5262 m. (p. 50 n. 4, p. 81), is very close but probably fortuitous. [Actually the total entablature height was evidently designed as twice the lower column diameter (J) or 3 5/12 feet = 1.1155 m. (measured 1.117 m., M), the cornice being set off as 1/7 of this or 0.1593 m. (measured 0.159/0.161 m.) and the remainder divided in the ratio of 9 : 11 between the architrave, 0.4303 m. (measured to 0.429/0.433 m.), and the frieze, 0.5259 m. (measured 0.526/0.5265 m.).] The same ratio is expressed as $10\sqrt{6} : 10\sqrt{9} = 24.494897 : 30 = 1 :$ 1.224745 ($\sqrt{2} : \sqrt{3}$) or as $\sqrt{\frac{2}{3}} : 1 =$ 0.816496 : 1,

[7] For the area ratio 2 : 3 and the assumed volume ratio 1 : 2, see below.

between the upper and lower column diameters K : J (pp. 80-81); in this case, furthermore, the author notes that the areas of circles of which the diameters are in the ratio $\sqrt{2} : \sqrt{3}$ would themselves be in the ratio 2 : 3 (pp. 80-81, 90). This is a very close coincidence, but again is probably fortuitous. [With the more probable dimensions 1 $^{19}/_{48}$ and 1 $^{17}/_{24}$ feet, it would seem that the architect merely made the upper diameter $^{5}/_{16}$ foot less than the lower, this being midway between $^{1}/_{6}$ and $^{1}/_{8}$ (approximately $^{3}/_{11}$) lower diameter]. Thus we may conclude that the alleged root ratios, of which the most important, column diameter to height, would be meaningless unless expressed in dactyls of the hypothetical foot, 0.297 m., likewise have no validity.[8]

As for the four great mathematical problems said to be illustrated in the treasury, the discovery of *pi* is evidenced (pp. 84-85) by the depth of the door jamb, 0.583 m., which when divided by 0.0185625 m. (dactyl of the 0.297 m. foot) would be 31.407408 dactyls, that is, practically 31.4159 (= 10 x 3.14159) dactyls. Thus, says the author, "on entering the door of the treasury of Cyrene one [literally] passed through the number $\pi$." But this depends entirely upon the use of the foot of 0.297 m. [We have found rather that the cross-wall was 0.572 m. or 1 ¾ feet thick, so that the door jamb, projecting 0.011 m. or ½ dactyl outside it, was 1 $^{25}/_{32}$ feet deep, a number bearing no numerical relation whatsoever to *pi*.] A less direct reference to *pi* is found in the lateral column interval, calculated as 0.949 m. and interpreted as 3 $^{5}/_{16}$ = 3.1875 feet, thus being $10/\pi$ = 3.183102. [But this numerical relationship is destroyed when we note that the enlargement of the rectified central axial spacing reduces the lateral intervals to 0.9315 m. or 2 $^{41}/_{48}$ feet, quite unrelated to *pi*.] Other uses of *pi* are said to occur in ratios, as between the capital height and the total column height (L), given as 11 ¾ : 208 dactyls = 1 : $10\sqrt{\pi}$ = 1 : 17.724539 (p. 82); in the conicity of the shaft, given as 5 ½ dactyls (lower diameter minus upper diameter) : 196 ¼ dactyls (column height minus capital) = 1 : $\sqrt{10}$ x 10 $\sqrt{4/\pi}$ = 1 : 35.682501 (p. 82); and in the ratio between frieze height and front width (G), given as 1 : $10\sqrt{4/\pi}$ = 1 : $20\sqrt{\pi}$ = 1 : 11.283792 (p. 83). But only the last of these bears any resemblance to the ratios given by the revised dimensions, 0.2175 : 3.878 = 1 : 17.829885, 0.101 : 3.6605 = 1 : 36.242574, and 0.5262 : 5.943 = 1 : 11.294185, respectively. We can only conclude that these dimensions contain no evidence of the discovery of *pi*.

The squaring of the circle is illustrated (pp. 83-84) by the relation between the circle formed by the echinus of the capital, with radius 0.297 m., and the height of the frieze, 0.5265 m. For the area of the echinus circle is $0.297^2$ x 3.14159265 = 0.2771167461 sq. m., and the square root of this, the side of the equivalent square, is 0.52642 m. Nothing could be more accurate! But is it not mere coincidence? For why should there have been such a relationship between the echinus diameter and the frieze height? The author's effort to give it numerical plausibility in Greek feet, with a radius of 1 foot for the echinus yielding a circle of 3.14159265 sq. ft., making the frieze height $\sqrt{\pi}$ = 1.772454 ft., seems to be in error because of the use of this foot of 0.297 m.

The duplication of the cube is represented (pp. 86-88) by the use of an identical dimension 126 dactyls ($100\sqrt[3]{2}$ = 125.992105) employed vertically in the doorway height (Y), horizontally forward to the stylobate face (T), and horizontally laterally from door opening to lateral anta face, forming the three governing edges of a cube. Now 126 x 126 x 126 = 2,000,376 cubic dactyls, and half of this volume would be 1,000,188 cubic dactyls, which to be sure would be the cube of 100 x 1, if the 188 extra cubic dactyls could be disregarded. But this depends, first on the dimensions themselves, and next on their numerical form as translated into Greek dactyls. Instead of being uniformly 126 dactyls, the height was apparently 2.362 m. = 7 $^{11}/_{48}$ feet, the forward projection ca. 2.318 m. = 7 $^{5}/_{48}$ feet, and the lateral projection is completely unknown. In these dimensions there seems to be no basis for the assumed ratio of volumes 1 : $\sqrt[3]{2}$.

The trisection of the angle (pp. 92-96) depends on the assumption that the cella interior was exactly square, 17 feet = 272 dactyls either way (S, W), making the angle to be trisected, formed by diagonals from the front corners to the middle of the back wall, 53° 8′. One third of this would be 17° 42′ 40″. The distance of 128 dactyls between the column centers (I), at a distance of 272 (W) + 31 (V) + 106 = 409 dactyls from the rear wall, would be subtended by an angle of 17° 47′ 12″, which exceeds the desired angle by only 0° 4′ 32″, a discrepancy at this distance of only 0.57 dactyl (0.0105 m.). Even if we were to regard this as negligible, it seems clear that the cella was not exactly square so that the angle of 53° 8′ is not that with which we are concerned. The width inside the cella has been found to be 5.057 m. (S), and the length probably 5.005 m. (W); the angle at the back of the cella would therefore be 53° 36′ 30″, one third of it being 17° 52′ 10″. The distance 2.409 m. between the column centers (I), at a distance of 8.243 − (0.443 + 0.2785) = 7.5215 m. from the rear wall, would subtend an angle of 18° 11′ 40″, exceeding the desired angle by 0° 19′ 30″. At this distance from the rear wall, the desired angle 17° 52′ 10″ should have given an axial spacing of 2.365 m.; the excess of 0.044 m. in the actual spacing 2.409 m. (I) is hardly negligible and seems to indicate that no effort to trisect an angle was exemplified in this plan.

If these methods be rejected, can others be substituted? A survey of the rectified portion of the Table of Dimensions suggests that the architect, upon finding that he had to build upon an older bottom step of 19 x 26 feet (C, D), receded by the same amount

[8] The other root ratios cited, 1 : $\sqrt{7}$ = 1 : 2.645751 in belt course to orthostate (p. 89), and 1 : $\sqrt{48}$ = 1 : 6.928203 as an alternative for lower diameter to column height (p. 90), are too inaccurate to demand consideration.

that the euthynteria projects, 5/24 foot, thus obtaining for the stylobate 18 19/24 x 25 19/24 feet (E, F). The stylobate width divided by 11 gave a manageable lower column diameter of 1 17/24 feet (J); and it was also divided into seven triglyph spacings of 2 11/24 feet (leaving one foot for the two half corner triglyphs), so that the central axial spacing became 7 3/8 feet (I). The column height was made 1/12 foot less than 7 diameters (11 23/24 feet) and so 11 7/8 feet (L) or 6 29/41 diameters, the entablature height exactly 2 diameters or 3 5/12 feet (M), and so the order height 15 7/24 feet, 1/12 foot less than 9 diameters, without any more abstruse calculation.

The reader of this review, if such there be, will doubtless heartily wish that plates XXXVI-XXXVIII had been omitted and that all dimensions in feet of 0.297 m. had been eliminated from plates XXX and XXXV, as well as all such computations and geometrical demonstrations in the text, together with all references to Theodorus, Theaetetus, and Plato. The reviewer can only hope that he has manifested the lack of foundation for this new method of architectural analysis (an offshoot of Hambidgian "dynamic symmetry") before it becomes an integral part of our archaeological vocabulary. But all must be grateful to the author for the careful documentation of this interesting architectural material, for its dating about 338-330 B.C. and for the cumulative evidence that it is in fact Cyrenaic, and for supplying the definitive evidence that it belongs to foundation XIII, thus settling one more disputed point of Delphian topography.

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DIE VERZIERTE SIGILLATA VON LAURIACUM (LORCH-ENNS), by *Paul Karnitsch* [Forschungen in Lauriacum 3]. Pp. 48, pls. 102, folding map. Linz, 1955.

Though not labelled as a *Jahrbuch*, the series *Forschungen in Lauriacum* is a "continuation" of which Vols. I and II appeared in 1953 and 1954. These earlier volumes contain articles by Professors Vetters, Eckhart and numerous others on the excavations at Enns and the evidence gathered from them; Karnitsch himself made a preliminary study of the decorated sigillata in Vol. I, and in Vol. II he compiled a list of signatures on the decorated and plain sigillata. His monographic volume under review largely supersedes these two earlier articles, except that detailed descriptions of individual sherds have been condensed, and that all plain ware is omitted. The introductory sketch reviewing the centers of manufacture, the profuse and excellent plates by the author's own hand, and the bibliography have all been expanded. As regards the last, Karnitsch has covered his continental publications fairly thoroughly, but he is admittedly short on his British titles, and he mentions nothing from American sources.

The sigillata at Enns is overwhelmingly imported from the great factories at Rheinzabern (558 pieces) which were active from the second quarter of the second century until ca. A.D. 260; the next highest representation is 97 from Westerndorf, followed by 24 from Lezoux, mostly late in that center's activity; 14 from Trier; 13 from La Graufesenque, also mostly late; and a small scattering from Montans, Banassac, Luxeuil, Heiligenberg, and none from Italy. (Curiously, these statistics are nowhere assembled by Karnitsch.) The folding map showing the centers of manufacture in Western Europe is much more inclusive and up-to-date than Oswald and Pryce's map of 1920 or Knorr's various excellent maps. But Karnitsch's displacement of Les Martres de Veyre from Dép. Puy-de-Dôme to Haute Garonne is a surprising slip. The plates are designed to reproduce the fragments, including their missing parts, as completely as possible. And finally, the work adds to its own intrinsic merits a helpful German summary of K. Kiss, "A Westerndorfi Terra-Sigillata Gyár," *ArchErt* (1946-47) previously available only in Hungarian.

On the whole, the study is a descriptive presentation of the material from an individual site, without much attempt to integrate it with larger considerations. One cannot complain at this specific and limited purpose; on the contrary, without such basic descriptive works the synthetic studies of more generous plan are impossible. But, with the publications of Lauriacum, Brigetio (Ó-Szöny), Aquincum and some other sites now available (though unfortunately not all in the major languages of scholarship!) it should be possible to compile a comprehensive conspectus of the Roman ceramics of the Danube Valley, noting and interpreting relevant similarities and contrasts between the different sites, for instance, the reversal of proportion between the products of Lezoux and Westerndorf at Lauriacum and Brigetio, and drawing historical and economic conclusions from them. Fremersdorf's "Rheinischer Export nach dem Donauraum," *Laureae . . . Kuzsinsky dicatae* (*Diss. Pann.* ser. 2, n. 10) is a good start, but is limited to items from the Rhineland. Second, certain potters have been the object of individual study and their styles and decorative motives have been isolated. Knorr has been the leader in this approach; Oswald, Delort, and many others have participated. The time has surely come for additional detailed monographs collecting the decorative motives of such leading potters as Cobnertus and Divixtus into a more manageable form than Déchelette's and Oswald's classic indices of figure-types. Third, the Roman archaeologist controls an enormous corpus of evidence which requires treatment by the art critic, the aesthetician, and perhaps even by the social psychiatrist. For it is *a priori* probable that despite the crudity of later Gaulish ceramic decoration there must have been something aesthetically novel or interesting or satisfying about it in the minds of its creators and contemporary purchasers. These Roman provincials presumably found beautiful the wild hodge-podges by Paternus and the heterogeneous combinations of the late Antonine pot-

ters of Rheinzabern (and worse to come under the Severi!) to whom scale, unified theme and rational thought were apparently unknown concepts. The surface of this subject has not been scratched.

Perusal of Karnitsch's book has led naturally to a reappraisal of some of my own past efforts in the same area. "Terra Sigillata in the Princeton Collection," *MAAR* 11 (1933) discussed seven sherds of which four were surely from Pannonia and the other three may well have been also. But though numerous publications of Danubian sites in the past twenty-odd years have contributed many new parallels to the Princeton sherds, they have added surprisingly little precision to the attributions proposed in 1933. A few notes: I still incline to attribute Princeton Sherd A to Paternus, though his ovolos on Karnitsch's plate 4 are different. Sherd C by Cobnertus now has many parallels from the Danube Valley. Sherd D may be by Janu(arius) II of Rheinzabern; cf. Karnitsch pls. 11 2, 12 5, 13 6. For Sherd E compare now Finály, "Az Aquincumi Muzeum Terra Sigillata Darabjai," *Budapest Régiségei* 9 (1906) 84, fig. 4 (unattributed). Divixtus of Lezoux, who is not common on the Danube, is still the preferred potter for Sherd F, but the fragmentary horse may well have been a deer or seabeast, all of which animals were commoner at Rheinzabern than at Lezoux; cf. Oswald *Figure-Types*. Sherd G suggests Juhász, *Die Sigillaten von Brigetio* pl. LIV 1 (unattributed). Of the Gaulish sigillata found at Antioch (Vol. IV, 1) fig. 39 157-159 is recalled by Karnitsch pl. 7 6, where references for the twisted columns are given. The "X-terminals" on these pieces are merely a pair of misshapen dolphins like those which often appear with a basket; the whole has been kindly attributed to Servus (2) by Miss Grace Simpson, who also attributes Antioch No. 162 to Jullinus and No. 165 to Doeccus.

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CATALOGUE DU MUSÉE ALAOUI. Nouvelle Série (Collections Puniques), Vol. I, by *C. Gilbert Picard*. Published with the assistance of the Institut des Hautes Études de Tunis. Vol. of text, pp. 304; vol. of plates CXXVII and two tables with drawings. Printed by La Rapide, Tunis [Text 1954, Plates 1955].

The author is Madame Colette Picard, wife of Gilbert Charles Picard, the son of the venerable Charles Picard at Paris. The couple are now in Strasbourg, where G. Ch. Picard is a professor in the Faculté des Lettres of the University; he was formerly Director of Antiquities of Tunis, and is the author of *Les Religions de l'Afrique antique* (1954).

In the Preface (pp. v-vii) it is explained why a new series was begun. There already exist three volumes of the Musée Alaoui in the Bardo at Tunis. The first appeared in 1897, one supplement in 1910 and a second supplement in 1922. P. Gauckler had divided the first catalogue into thirteen parts according to subjects: A. mosaics, B. architecture, C. sculpture, D. epigraphy, E. objects in gold and silver, F. objects in bronze, G. objects in iron, H. objects in lead, I. terracotta figurines, K. lamps, L. bricks, M. ceramics, and N. sundry. In each category the objects of the different civilizations of North Africa are united. The collections have been much enriched by new finds and new excavations in the 33 years since the publication of the second supplement. The research of Poinsset and others has added much importance to the monuments. To add another supplement would have meant that for each group four volumes would have to be used.

The new series, for all these reasons, plans to redistribute all the material according to the four civilizations of North Africa: Punic, Roman, Christian and Islamic. The published volume contains only the first part of the Punic civilization, and indeed only architecture and sculpture. The architecture with 17 numbers fills only pp. 1-16 and pls. I-VII, 1, the sculpture with 1114 numbers the remaining 288 pages and 121 plates. Each part is preceded by a general historical introduction. The arrangement is geographical, in alphabetical order; the first place, also containing the largest numbers of items, is Carthage. In each division the arrangement is chronological. The reviewer and probably many others not familiar with the geography of French Africa might have preferred a chronological order throughout, as the geographical arrangement leads to repetitions of the same type in different places. Each number is carefully described, dimensions, provenance, date, bibliography, and place of exhibition. The latter is in the most cases the Musée Alaoui. The reviewer feels that many pages could have been saved by lumping together the types which are alike from different places and also the illustrated and the non-illustrated monuments. The catalogue might have been reduced to at least half of its size, as only about half of the monuments described are illustrated. On the other hand, the full discussion of each number is welcome to the specialist.

The number for the architectural fragments is preceded by an A (instead of B), for sculpture by a C (the same as in the older catalogue). The preface for architecture (pp. 1-6) describes the different phases of the development and the character of the Punic architecture; Asiatic, Egyptian, Greek archaic to classical influences, and their mixtures, are discussed. Even after the destruction of Carthage in 146 and in the imperial period this Oriental-Graeco syncretism continued. There are only a few actual architectural remains of the Punic period: Capitals of mixed Egyptian and Greek Doric form of the fifth century B.C. (A 1-2); one of Doric style (A 3), four of Ionic form belonging to the fourth century (A 4-7); a pilaster with an aeolic capital (A 10), and three Ionic capitals (A 15-17) of the Hellenistic period. Most interesting is the fragment of a frieze representing Macedonian weapons with a fine head of Artemis, dated into the first century B.C. (A 14). This meager selection can be supple-

mented by Mausolea such as the one near Dugga (G. Ch. Picard, *Les Religions de l'Afrique antique*, pl. 1) and many votive and funeral steles representing chapels which have been discussed under Sculpture. An excellent example of the mixture of decorative and architectural motifs coming from different sources is the little chapel dedicated to Demeter, No. Cb 1082, p. 300f, pl. CXXVII-Catalogue Musée Alaoui Supplement II (1922) 35, B. 142. It is dated in the first century B.C. The heavy entablature is decorated with four Greek mouldings, but crowned by an Egyptian cornice. The capitals are called here and elsewhere "archaic Corinthian" by the author (p. 6, Nos. A 10-12, pl. V; p. 32; pp. 267-72, Nos. 966-70, 972-74, 1014, pls. CIII, 2—CXVIII, 1). The reviewer prefers to name them aeolic or proto-Ionic with Dinsmoor (*The Architecture of Ancient Greece*, 1950, p. 61, fig. 21, pl. XVIII). The volutes leaving a triangle between them are also a Phoenician type (see Dinsmoor, pp. 58ff).

The introduction to Chapter II, C, the Sculpture and Engraving on Stone (pp. 17-34) gives in contrast to the geographical arrangement of the catalogue proper an historical survey on the Punic sculpture. Madame Picard emphasizes rightly that the quality of the many thousand Punic objects is very low, in contrast to the religious interest, which has been discussed in the volume *Les Religions de l'Afrique antique* of her husband Gilbert Charles Picard. The funeral monuments from the cemeteries and the votive steles from the *tophets*, that is, the sanctuaries of Baal Hammon and Tanit, the two main gods of the Carthaginians, show relatively little development from the sixth century B.C. to the second A.D., during which they were carved or engraved. There seems to be also little difference between sculpture in the round, Nos. Ca 1-24 pls. VII 2—X 1 and the steles, Nos. Cb 1-1090, pls. X, 2—CXXVII. The flat protomes Ca 1-3, the statues without depth Ca 9-20, are really half relief and half statue, while Ca 21 has the bust of a goddess, with the half moon behind her head, probably Tanis, absolutely carved in relief. The childish face engraved on a large pebble Ca 23 is certainly just a design, not a sculpture in the round. The votaries holding one hand before the breast with an object, and the other hand lifted in adoration, are certainly the same in the half statues as on the steles Cb 1-99, both groups dated by Madame Picard in the third to second century B.C. The same date is also given to the steles of the same kind Cb 1053-66.

The oldest religious votive offerings in the sanctuaries of Carthage and others are Betyls, mostly in the form of pillars, believed to contain sacred power, or believed to represent divine beings. They are set up in small chapels with Egyptian moulding and an Uraeus snake (Cb 101-24, pp. 69-74; Cb 255-93, pp. 108-16; Cb 479-88, pp. 155-57, pls. XVIII-XXI, XXXVIII-XLI, LX,4-LXI). They belong to the seventh-fifth centuries B.C. Only in Sousse, where the Phoenician tradition always remained strong, there are some more elegant examples of the third century (Cb 1078, p. 299, pl. CXXVI,4, and 1080, p. 300, pl. CXXVII,2). There are also instead of the pillars some crude images in the form of rectangles, losanges or hexagons beginning in the fifth century (Cb 130-36, 139-41, pp. 76-79, pls. XXII,3-4—XXIII; Cb 301-15, pp. 118-21, pls. XLII-XLIII). In two cases (Cb 293, p. 116, pl. XLI,2 and Cb 488, p. 157, pl. LXI,2), these betyls are combined with those in the form of a pillar.

Since the end of the fifth century, however, these crude symbols make place for the sun disk and the crescent, being the emblems of the two main Punic gods, Baal Hammon and Tanit. But after the beginning of the fourth century, all symbols for Baal Hammon are displaced by a geometric anthropomorphic form resembling a bottle, and for Tanit by one resembling the Egyptian Ankh, the sign of life. Two excellent tables show their different forms. The "bottle" of Baal disappears after the third century, but he continues to be venerated in the Roman period as Saturn, particularly in Sousse. Examples of the sign of the bottle in a chapel, from Carthage, belong to the fifth or fourth centuries (Cb 141-54, pp. 79-82, pls. XXIII,4—XXVI,2; 175-93, pp. 87-92, pls. XXIX-XXXII,2; 318-33, pp. 122-25, pls. XLIV-XLVI,2). Almost all of the steles not yet mentioned show the sign of Tanit, who as Caelestis survives even the Roman destruction and Roman colony of Carthage. One stele is carved in the form of Tanit: a trapeze with the small side up, a horizontal stripe, indicating arms, and a circle for the head Cb 552, p. 168, pl. LXVII,1). The bottle and the Tanit sign push sun and moon into the uppermost part of the steles. It is amusing to see how sometimes the round circular head of the Tanis idol gets loose from her body and replaces the sundisk (Cb 421-25, p. 143-44, pl. LVII and Cb 574-88, pp. 172-75, pls. LXIX, 3-4—LXXII,1). These examples all belong to the fourth century B.C. In some cases a more anthropomorphic idol is used, but I believe that all representations are abstract renderings of her emblem. One (C 490, p. 157, pl. LXI,4) keeps the outstretched arms of the symbol.

I believe, therefore, that also on the steles from La Ghorfa (near Dougga) of the second century A.D. it is not the genius of Tanit, as the author calls it, that is represented, but only a differently stylized anthropomorphic figure of Tanis-Caelestis. These twelve steles are the largest and richest which have been found in French Africa (Cb 963-74, pp. 262-73, pls. CII,2—CVIII,1). They all have large triangular finials. Tanis holds out both arms with small cornucopias from which hang on her right side a large grape above Bacchus, and on her left side a large pomegranate above Venus, who in two cases (967-68) is accompanied by Eros. In three cases (963-65) and in three fragments from Oudna (Cb 1072-74, pp. 297-98, pl. CXXV) Tanis-Caelestis is alone and holds the large fruits without horns of plenty. Above her are sun, moon and stars. She stands above the center of the gable roof of the aedicula, while Bacchus and Venus stand at the corners. The tympanon of the gable is filled with an eagle (966, 969), a dove (970), but mostly with a bust. Between the entablature, decorated with several mouldings, and the richly framed

niche the ceiling is represented in the primitive perspective which lifts it at right angles, so that it is in the same vertical plane with columns and the entablature, although it ought to be at a right angle going backward. It shows coffres and in the center the sun-disk as a rosette between two crescents. The building so richly framed is called a temple by Madame Picard, but as the figure in it is rightly called the dedicator, I believe that this is a niche in a kind of tomb monument, which, in Roman times, and also in other provinces, were built as large and costly as possible. The men and the female represented may be Romanized and rich Punic merchants or officials. I, however, do not believe that they wear the toga, as Madame Picard constantly calls the draped mantle. It is the pallium, the Roman equivalent for the Greek himation. Two of the steles (973-74) have Latin inscriptions. The deceased, like most dedicants, hold a round object in their hands, which the authoress explains throughout as a "cassolette," a perfume vase or incense box. I believe I see in several cases a fruit, most likely a pomegranate, which has funereal meaning. It may have come with Demeter and Kore from southern Italy to Carthage, and was transferred to Venus.

No explanation is given for the two "caryatides" (on 966, 968, 972, 973) who carry the socle on which the aedicula is resting. I believe that these stout nude women are oriental goddesses like the four at the side of the Cypriot sarcophagus in the Metropolitan Museum at New York (John L. Myers, *Handbook of the Cesnola Collection of Antiquities from Cyprus*, 233, No. 1365 c). From the same sources may come the god holding snakes in the lowest register of 970. These lowest parts are filled on other steles with the sacrifice of a bull (963, 964, 972, 973), and on one with the fight of Herakles with a lion (971). Thus these large steles show a mixture of old oriental traditions and Graeco-Roman elements, with a peculiar flavor, which distinguishes them sharply from all other provincial sculpture of the Roman provinces. Particularly noticeable is their religious content in contrast to the more worldly scenes on tomb monuments of Gallia, Germania, and the Danube valley.

Beside these steles from La Ghorfa representations of Punic gods in naturalistic human form are rare. The only certain examples are from the *tophet* for Baal Hammon and Tanit in Sousse belonging to the fifth century B.C. (Cb 1075-77, p. 298f, pl. CXXVI): Baal on a throne, flanked by a sphinx, with a worshipper. It may be Tanit seated before an altar of incense, wrapped in her large mantle (1076-77). The latter may however even be a priestess, not the goddess herself. Certainly a priest with a child to be sacrificed is Cb 229, p. 101, pl. XXXV,4. The rider (Cb 688, p. 196, pl. LXXXIV) is hardly Ares, as Mr. and Mrs. Gilbert Picard believe. Mercury appears once instead of Caelestis on one of the La Ghorfa steles (970). He is, however, very frequently represented by his herald's staff, which develops into an ornament, standing erect in pairs, flanking other symbols (Cb 596, 672-85, 803, 822, 835-49, 934, 949, 1078).

Another very frequent symbol is the open hand with part of the arm (Cb 642, 649, 658-67, 672, 677, 680-84, 704, 708-12, 800, 807-10, 824, 835-36, 839, 849, 893, 913, 916-18). Most examples belong to the third century B.C. and are inserted in the gable of the stele. Madame Picard (p. 25f) believes that this is the hand of a godhead blessing and representing such a divinity. I believe that it means praying or adoring, as the hands of more than a hundred votaries are lifted in prayer (Cb 1-99, 1053-66). This occurs not in Tunis only but already in Cretan-Mycenean and Cypriot art. See, for example, the Cretan-Mycenean cylinders (Myers, *op.cit.* p. 438, Nos. 4320-21), and the late Minoan III Cretan idol from Knossos with a particularly large hand: Bossert, *Altkreta*, fig. 152; idem, *The Art of Ancient Crete*, pl. 169, fig. 293. Zervos, *L'Art de la Crète*, fig. 767; cf. also, figs. 771-75, 803-07. The ears on the acroteria of Cb 658, p. 189, pl. LXXIX,3 and 809, p. 218, pl. XC,4, flanking the hand in the gable, also must mean the attentive ears of the worshipper turned up to the god.

Symbols of fertility used since the third century B.C. are the pomegranate (Cb 976, 983, 1005-06, 1010, 1024, 1067); branches with leaves (Cb 451, 1028, 1033); the palm tree (Cb 449, 452, 666, 671, 700, 977, 992, 1011); the pine cone (Cb 939, 1004-05); the fishes and dolphins (Cb 169, 924, 965, 976, 988-89, 1004-07, 1010, 1013). The doves may be attributes of Aphrodite-Venus (Cb 684, 939, 970, 976, 980, 987-89, 993, 1010-12, 1073). The lambs (or rams, béliers), in my opinion, are the sacrificial animals which replaced the sacrifice of children (Cb 686, 849, 853, 866).

This tedious enumeration gives an idea of the rich variety of decorations on the steles in the Musée Alaoui. It would not be necessary, if an index had been added. It is to be hoped that both an index and a table of contents will be given in tome II of the new series, and that this and the following volumes will appear soon.

The print of text and plates is excellent. I found only one serious misprint, p. 22, note 4, read: Olsen and Lehmann, instead of Obsen Lehmann. The pictures, mostly four to a plate, are clear. There are no references to the plates in the text, but the numbers of the catalogue are under each figure.

MARGARETE BIEBER

NEW YORK

PREHISTORIC SETTLEMENT PATTERNS IN THE NEW WORLD, edited by *Gordon R. Willey*. Pp. viii + 202, figs. 15, tables 5. Viking Fund Publications in Anthropology, Number 23, New York, 1956. $5.00.

This volume is the fruitful expansion of a symposium which was originally held at the 1954 Annual Meeting of the American Anthropological Association.

14 papers have been added to the original 6 contributions, making a total of 19 areal papers representing 21 different archaeologists. The introduction and one areal paper are by the editor, who was also the chairman of the initial symposium. The concluding appraisal is by an ethnologist, Evon Z. Vogt, who likewise took part in the 1954 meeting.

The book represents a determined effort to describe systematically and to interpret dynamically the traces of man's prehistoric settlements in the varied environments of a large part of the New World. The survey includes much of North America, Mexico, Mesoamerica and the Caribbean, the South American coverage is confined to Peru, the Tropical Forest, and those coastal sections which are part of the Caribbean zone.

As a number of the contributors note, Willey's recent investigations in the Virú Valley of Peru have resulted in the only full knowledge that we now have of prehistoric settlement patterns in the New World. Generally speaking, unscientific excavations and lack of time or funds have meant that only the most fragmentary information is available. Yet without exception the present papers make rewarding reading. Although variable in the amount of detail included, all are careful and up-to-date attempts by recognized specialists to analyze the successive settlement patterns in the different areas. New and interesting data and ideas appear constantly, especially since there is a challenging variety of interpretations as to what exactly constitutes a "settlement pattern" and as to what significant conclusions may be derived from such patterns in terms of man's cultural behavior. Understandably it is in these more theoretical aspects of the problem that the individual interests and biases of the authors show up most clearly. For example, some writers emphasize the limitations of archaeological evidence far more than do others. There is a considerable range in the degree of willingness to speculate on the probable relationships between the settlement layouts and the sociopolitical or religious organization of the people who lived in them. Several papers are quite programmatic, and their authors deal particularly with the typology of settlement patterns. Others have concentrated on available evidence for demographic stability and change, on the nature of seasonal occupations, or on the analysis of varied topographic features and other ecological factors such as river flooding or amount of rainfall. Conditions of preservation make possible quite detailed discussion of the architecture of some regions, while elsewhere even the type of house structure must be inferred. A number of interesting efforts have been made to tie together prehistoric and historic ethnographic data.

But as the cogent concluding review points out, whatever their special emphasis or combination of emphases, all authors must ask themselves two questions: First, to what extent has the environment determined or limited man's sociopolitical patterns; and second, to what extent have cultural interests overridden apparent optimum adjustments to a given ecological situation?

The writer of the final paper also suggests that the interest in settlement patterns is part of a current and widespread scientific interest in "territoriality" as a "critical factor in the study of animal and human life." However, Willey himself says that there is no "settlement-pattern approach" *per se* in archaeology. His interest lies in the fact that: "An awareness of settlement data simply extends the net of archeological interest to take in a larger and legitimate part of the record." Much the same thing may be said, of course, for a "settlement-pattern approach" in ethnology. It offers but one of many lines of inquiry leading to an adequate understanding of culture and culture change. The ethnologist has the advantage of fullness of data; the archaeologist has the broader sweep of time.

The present book, then, is an important and very provocative volume for both archaeologists and ethnologists. Willey's hope that they will use it as a stimulating reference is strongly seconded by the reviewer.

CATHARINE MCCLELLAN

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A HISTORY OF THE ANCIENT SOUTHWEST, by *Harold S. Gladwin*. Pp. xx + 383, ills. xvii. Portland, Maine (Bond Wheelwright Co.) 1957. $8.50.

For about twenty years Mr. Gladwin was the *enfant terrible* or thorn in the side—or catalyst and goad and inspiration—of North American, particularly Southwestern, archaeology. Directly responsible for the recognition and definition of the Hohokam culture of southern Arizona and the Mogollon culture of southern New Mexico-eastern Arizona, as distinct from the well-known Anasazi Basketmaker-Pueblo sequence of the northern Southwest, and of the early pre-ceramic Cochise culture, Mr. Gladwin has also brought forth various other striking and radical ideas which have contributed less effectively or not at all. His central interest or prime objective throughout has been to account for the presence of differing types, cultural and physical, of Indians in the Southwest and adjacent regions; to determine their sources and explain their relationships, leaving no loose ends dangling untied. His ideas have generally been logical, often brilliant, frequently oversimplified.

In 1937, in *Excavations at Snaketown. II Comparisons and Theories* (Gila Pueblo Medallion XXVI), along with firm establishment of the Hohokam, Mr. Gladwin discussed early man in North America and Indian physical types, and presented comparisons and analogies between Old World and New World cultures, and offered a theory involving three major immigrations from northern Asia to North America: (1) Upper Paleolithic Australoids, (2) Folsom-Archaic-Woodland culture and Negroid(!) physical type, (3) advanced culture (Neolithic-copper: pottery, agri-

culture, weaving) brought by Mongoloid brachycephals, here and in later discussions called "the Cordillerans," a term and an idea he withdrew in 1948. Equally shocking at the time was the estimated chronology for Hohokam development, which put the beginnings of the Snaketown site, with pottery and agriculture, at about 300 B.C., or eight hundred years before the appearance of pottery among the Basketmaker-Pueblo Anasazi of the Four Corners region in the northern Southwest.

In revisions published in 1942 and 1948, however, Mr. Gladwin pulled the chronology up, reducing his estimates for duration of periods and proposing that the early "Pioneer" phases actually were Mogollon rather than Hohokam and concurrent with Colonial Hohokam, bringing the beginnings of Snaketown up to between A.D. 600 and 750—thereby running against the current almost as sharply as he had originally. There is a widespread feeling, by now, that the "Pioneer" period at Snaketown was Mogollon in a broad sense and that the true Hohokam came in, from Mexico, with "Colonial" times; but the telescoping of the Snaketown chronology has not been generally accepted and Mr. Gladwin's revision and reinterpretation of the stratigraphic evidence there has been shown to be statistically and logically unsound.

In the meantime, also, Mr. Gladwin produced the ingenious and entertaining tour-de-force *Men Out of Asia* (Whittlesey House 1947), with a series of separate migrations climaxed by bringing Alexander's "lost" fleet under Nearchus in 323 B.C. across the Pacific to South America to explain a great variety of parallels or analogies in a single diffusionist bundle—a persuasively presented incredible example of the kind of thing which could well have occurred.

Now, after a gap, we have Mr. Gladwin's final or semi-final word, the general book on Southwestern archaeology on which he had been working for some years and which had been anticipated with perhaps mixed emotions but certainly with considerable interest. I find it a disappointment. The book is "popularly" written but with the effect of a deliberate effort and of remembering to be facetious occasionally, instead of with the persuasive and disarming easy informality of several of his previous works (page 222 contains two of the exceptions to this particular stricture). And it is neither a definitive, thorough, systematic, dependable coverage of Southwestern archaeology, such as is very badly needed; nor a stimulating and thought-(and argument-) provoking sketch of heretical notions, such as would be expected from Mr. Gladwin. The arrangement primarily by period, one or two centuries at a time, taking up one section after another of the Southwest for each horizon, is one which should be good but which I find confusing. Finally, a less subjective general criticism is that, as often in general books or papers on Southwestern archaeology, much of the region is overlooked: in this case, almost all of the "peripheral" areas, the Rio Grande Valley and southeastern New Mexico, the western Arizona desert, most of Utah, and the Moapa Valley area of southern Nevada.

The story as presented by Mr. Gladwin involves several quite separate groups: (1) the very early people, Upper Palaeolithic, again labelled "Australoid" or Melanesian, forming the basic original Cochise-Basketmaker stratum of Southwestern population; (2) an imaginary group called simply "Farmers" who brought maize and pottery and pit-houses to the northern Southwest; (3) the Mogollon or "Cordilleran" element in the south, now labelled by the irritating nickname "Reds," bringing agriculture and polished brownware (some of it red-slipped) and shallow pit-houses into the Cochise area; (4) the Hohokam, entering the Gila Basin abruptly and full-blown from western Mexico. The history of Southwestern populations and cultures after A.D. 700 is then interpreted by tracing each of these elements and various combinations thereof. Here I shall not attempt to summarize and criticize this narrative step by step. Actually, it is quite possible that, as has occurred before, Mr. Gladwin is not far off the probable truth; but, as has also happened sometimes in the past, his presentation is highly selective and hypothetical, not thorough and objective.

For examples of misinterpretation and of sheer carelessness, we may take the matter of physical types. First of all, Mr. Gladwin sets up an "Australoid" early stock, on extremely scanty evidence and very flimsy reasoning (and, as he has before, omits any reference to the only pertinent early skeletal material from East Asia, that of the Upper Cave at Chou Kou Tien), and—even more tenuously—connects the Basketmakers and Cochise people with it.

Next, with positively specious reasoning, Carl Seltzer's demonstration of racial continuity and virtual identity of physical type between early Basketmakers and later Pueblo Indians is twisted to imply two quite distinct Basketmaker types. Identification of the "Reds" (Mogollon group) as Mongoloid brachycephals in effect perpetuates the old error which Seltzer and T. D. Stewart cleared away some 15 years ago. Finally, on page 122, after discussing the eighth-century Pueblo I ruin (Site 13) on Alkali Ridge in southeastern Utah, Mr. Gladwin remarks that there, "I believe, all of the skulls were brachycephalic and deformed." The human skeletal remains from Alkali Ridge do not come from Site 13 but from later ruins in the same area, all published in the same report.

In the last several chapters, dealing with the period from A.D. 1000 onward, primary emphasis is placed on the still controversial theory that the Apache tribes (including the original Navajo) arrived in the Southwest comparatively early and that Athapaskan pressure was responsible for the whole series of population shifts, abandonments of districts, concentration in large centers, and the frequent defensive features or defensible sites of cliff-dwellings and other pueblos thereafter. Now, this is very possible and is widely believed; but Mr. Gladwin's discussion adds little to its credibility, simply assuming it as a fact or stipulation and

telling the story of what may have happened entirely in terms of that hypothesis (and not unreasonably, rather believably—but assumption is piled on assumption, and I would have preferred to see mention of possible alternatives and of other contributing factors). Another questionable or at least controversial view is that of the "Salado people" and their supposed migrations, far too detailed a matter to discuss here, which Mr. Gladwin still presents as if it had never been seriously doubted.

There are other less important matters which could be criticized or debated; the point is that a potentially valuable and important book, containing a great deal of perfectly good factual information and many useful ideas and penetrating suggestions, is largely vitiated by incomplete and occasionally inaccurate presentation of data and by one-sided and arbitrary theory and interpretation. I wish that Mr. Gladwin had made this a more thorough and convincing job; I hope that its cavalier and careless approach will provoke someone else into doing a similar but more serious and systematic and open-minded and well-rounded treatment of the subject of Southwestern archaeology, a field in which much information has been garnered and many specific minor or localized hypotheses have been offered, but for which no adequate synthesis or handbook or other general summary has yet appeared.

ERIK K. REED

NATIONAL PARK SERVICE
SANTA FE, NEW MEXICO

# PLATES

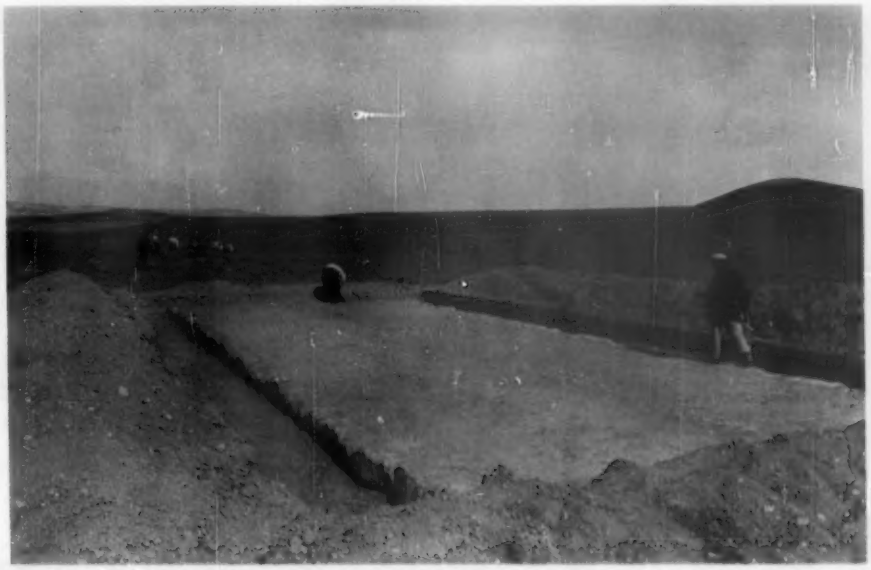


FIG. 1. The ancient road as exposed just to the east of the great tumulus, looking east

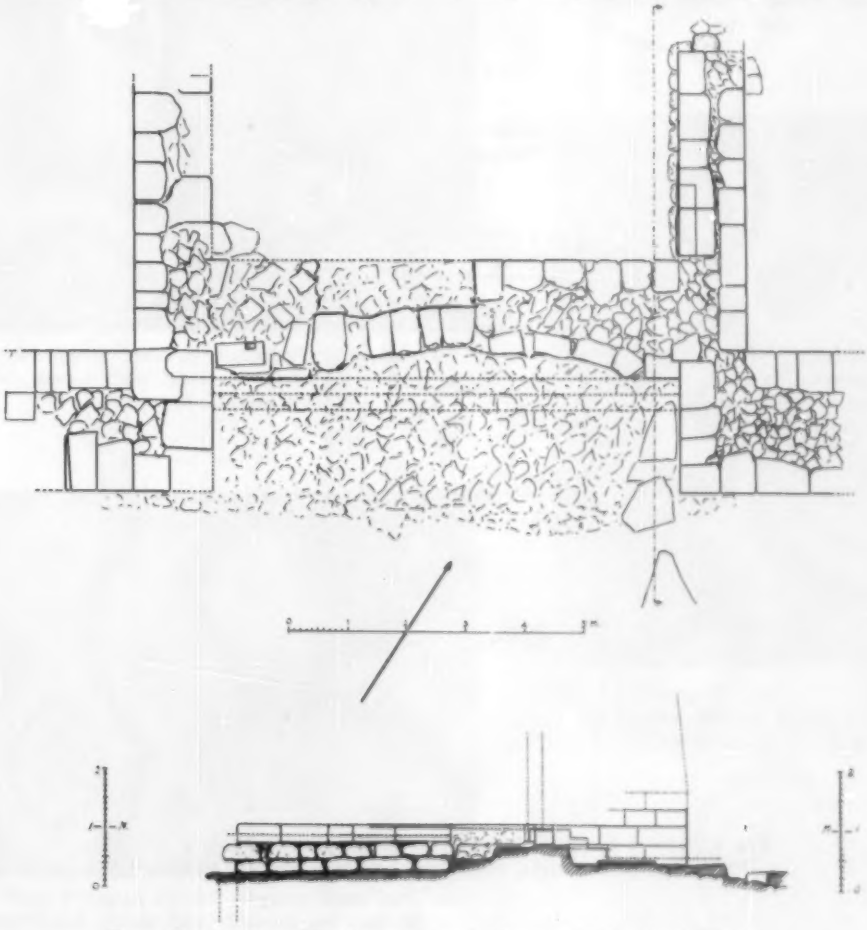


FIG. 2. Inner pylon of Persian gate court: plan and section, by J. S. Last

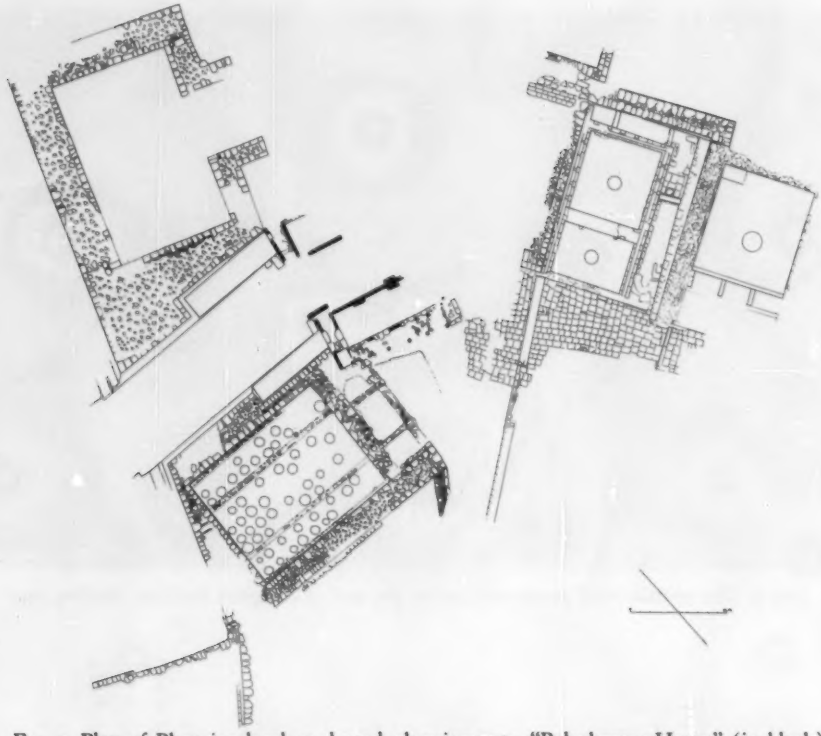


FIG. 3. Plan of Phrygian level as cleared, showing gate, "Polychrome House" (in black), paved area, and Phrygian houses fronting on it. By J. S. Last

FIG. 4. Plan of Phrygian houses: Burned Phrygian Building at left, West Phrygian House at right, South Phrygian House above. By J. S. Last

FIG. 5. Burned Phrygian Building from northwest

FIG. 6. Southwest corner of Burned Phrygian Building, from south, showing brickwork and niches for wooden posts alternating at different levels

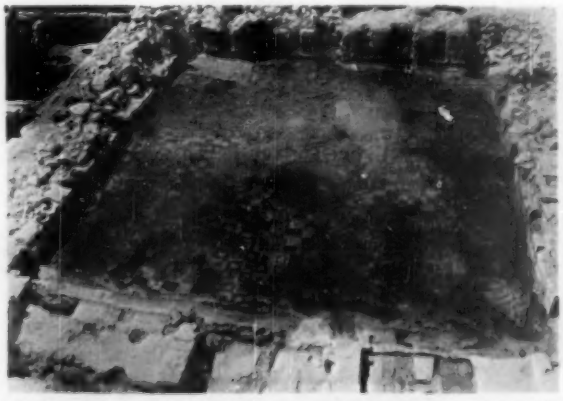


FIG. 7. West Phrygian House: megaron from north with hearth and mosaic floor; doorway and parts of niche-rooms at either side in foreground

FIG. 8. Closet between vestibule and megaron, to east of central doorway, from west

FIG. 14. Corner of bastion of crude brick on smaller mound, which carried the burnt Lydian building

FIG. 9. Woodwork of east side of door frame in doorway between vestibule and megaron

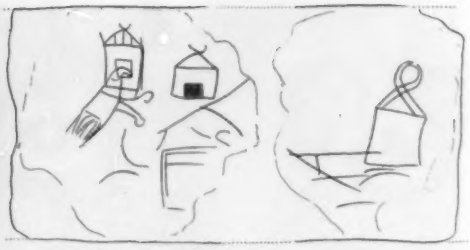


FIG. 12. Doodle stones: houses. Tracing made from rubbing of the stones

FIG. 11. Doodle stone: warriors fighting, the one at right evidently superimposed over an animal. Another small figure upper left

FIG. 13. South Phrygian House: stacks of bowls over floor, and fragment of wicker basket (left)

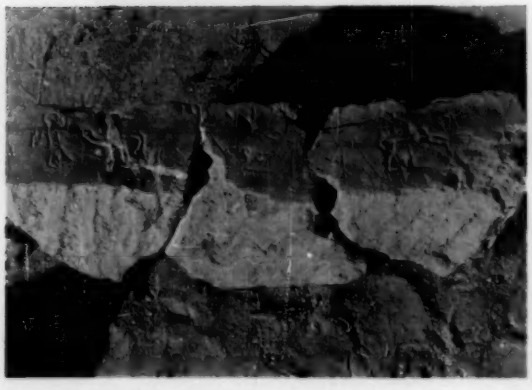


FIG. 10. Doodle stone from east end of south wall; two pairs of boxers, and mutilated figures between

FIG. 15. Tumulus P: broken cover from north, showing intact beams along south edge and broken cross-beams, as found

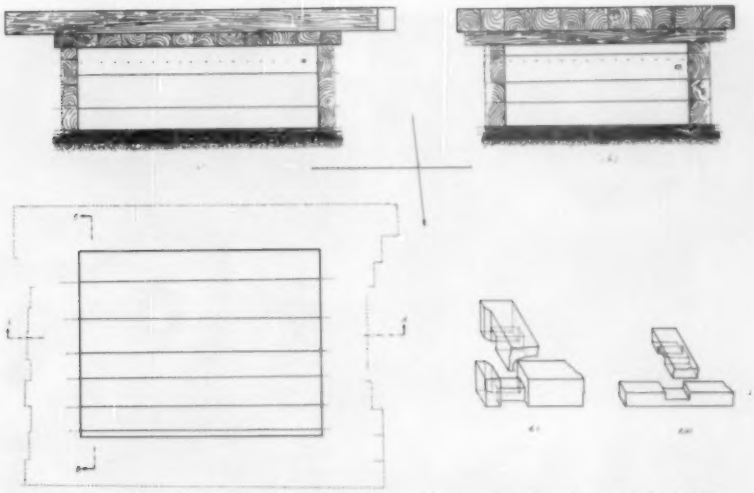


FIG. 16. Tumulus P: plan and section of wooden grave chamber. By J. S. Last

FIG. 17. Tumulus P: bronze cauldron at center of chamber, containing various objects of wood

FIG. 18. Tumulus P: group of lion attacking bull, from bronze cauldron

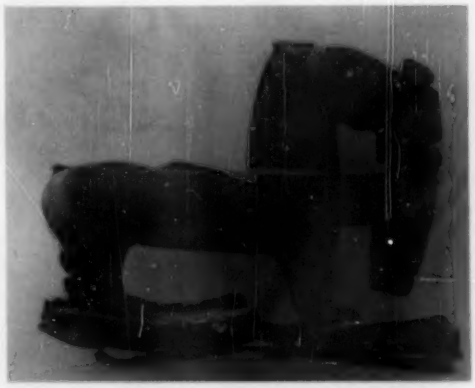


FIG. 20. Tumulus P: wooden winged horse, eating, from bronze cauldron

FIG. 19. Tumulus P: wooden lion from bronze cauldron

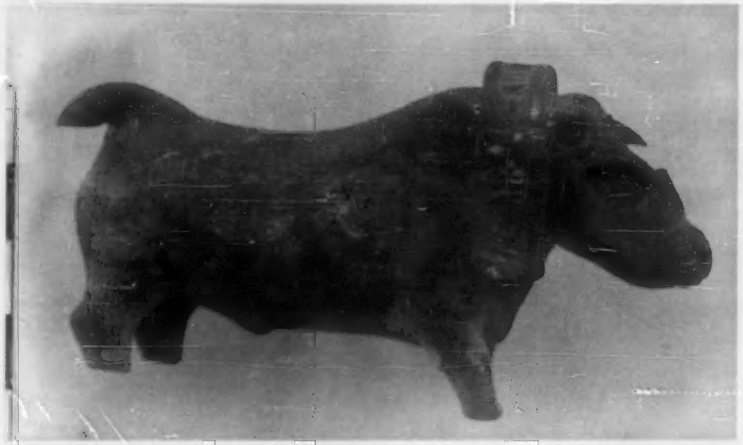


FIG. 21. Tumulus P: wooden ox with yoke, from bronze cauldron

FIG. 22. Tumulus P: bronze belt as found in area of bed, with bronze fibula and fragments of curtain rods. Round-bodied pots had been under bed

FIG. 23. Bronze belt with engraved geometric decoration, from Tumulus P

FIG. 30. Two ring-handled bronze bowls from Tumulus P

FIG. 26. Tumulus P: three long-necked askoi, the two outer ones black on buff, the middle one black on red

FIG. 24. Tumulus P: Painted Phrygian goose-pot, black on buff

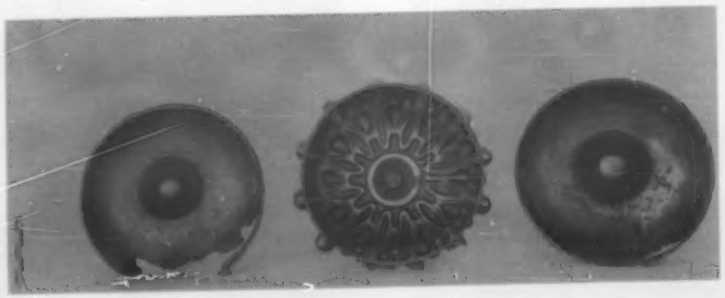


FIG. 31. Three bronze omphalos bowls from Tumulus P

FIG. 25. Tumulus P: round-mouthed jug, with bull in panel, black on buff

FIG. 28. Tumulus P: goat jug, black polished

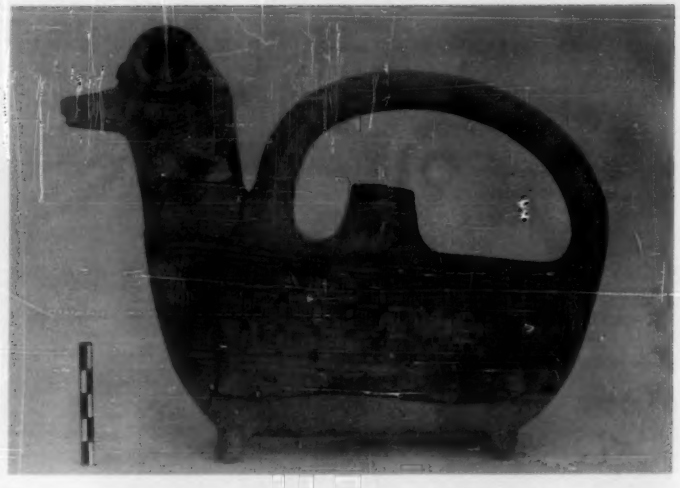


FIG. 27. Tumulus P: ram jug, black on red

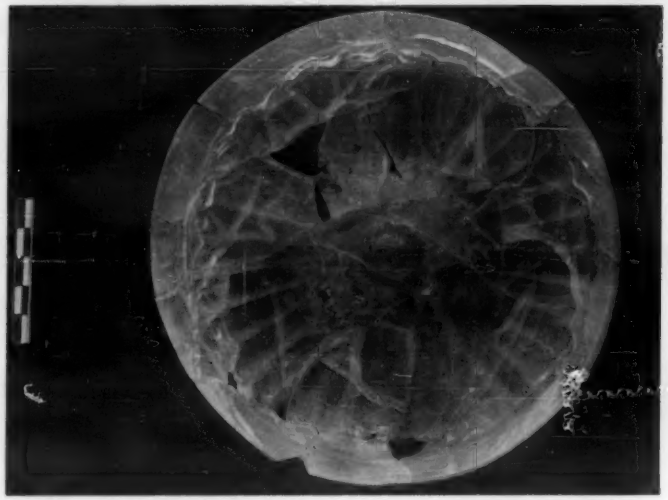


FIG. 32. Ribbed mesomphalic bowl of clear glass, from Tumulus P

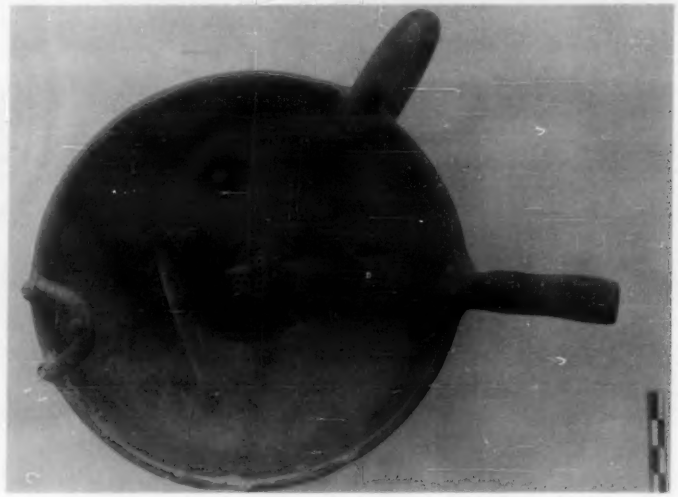


FIG. 29. Tumulus P: spouted sieve-omphalos bowl, black polished

FIG. 33. Tumulus P: fragment of wooden bowl carved in imitation of bronze

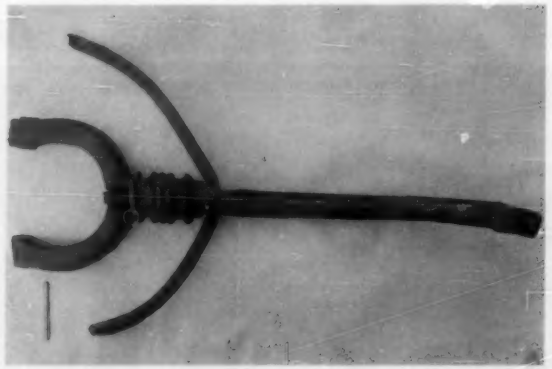


FIG. 35. Tumulus P: canopy-holder(?) of boxwood

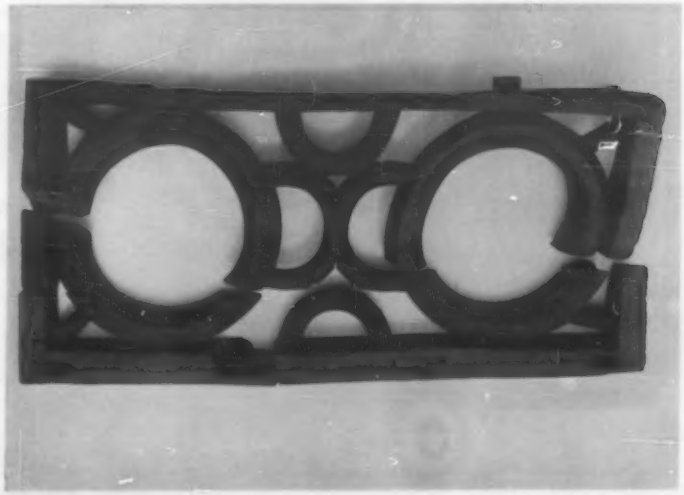


FIG. 34. Tumulus P: carved panel of boxwood to support canopy-holder(?)

FIG. 36. Tumulus P: panel from front of throne, which connected upper parts of front legs

FIG. 37. Tumulus P: back of the wooden throne, back face

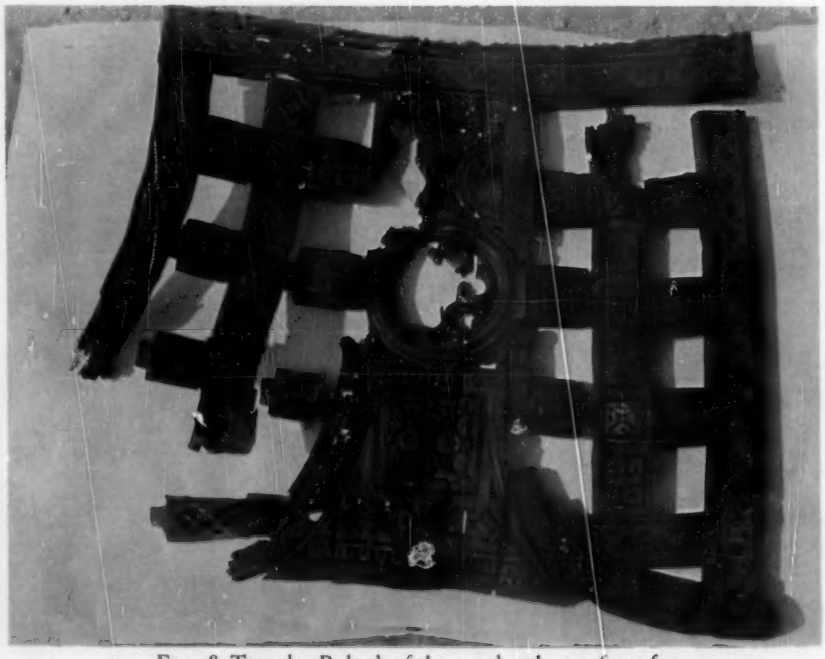


FIG. 38. Tumulus P: back of the wooden throne, front face

FIG. 1. Bronze cups and situla from the Wagon Grave period in Germany (Bayerische Vorgeschichtsblätter 21, Munich 1954, pl. 3, 2)

FIG. 2. Cauldron from the Older Hallstatt culture (Åberg II-III, *op. cit.* p. 22, fig. 23, Grave 600, Hallstatt)

FIG. 4. Urn with disk-duck design from Denmark, Period IV (Åberg, *op. cit.* p. 91, fig. 167)

FIG. 3. Pail and cauldrons from Hungary (Hampel, Compte-Rendu de la 8$^{\text{ème}}$ Congrès Intern. d'Anthropologie à Budapest, 1876, Vol. 2, second part, pl. LXV)

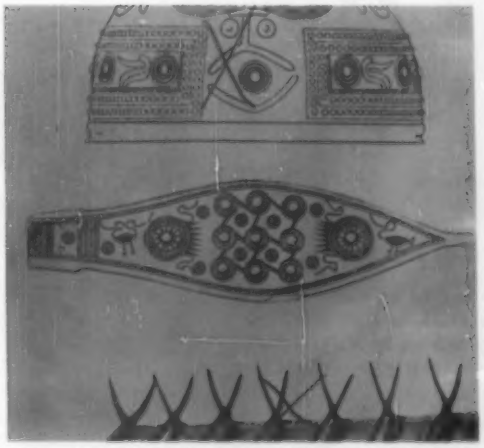


FIG. 5. Bronze belt from Populonia (Montelius, *La civilization primitive en Italie*, II, 2, pl. 281, 2)

FIG. 6. Bronze belt from a Corneto inhumation grave (Montelius, *op. cit.* II, 2 pl. 285, 4a)

FIG. 7. Bronze pyxis from Benacci II (Montelius, *op. cit.* I, 1, pl. 81, 6b)

FIG. 8. Terracotta fruit stand with pelican design from Veii (Montelius II, *op. cit.* 2 pl. 350, 12)

FIG. 9. Bronze pitcher from the Older Hallstatt period, Grave 500 (Åberg, *op. cit.* II-III, p. 16, fig. 12)

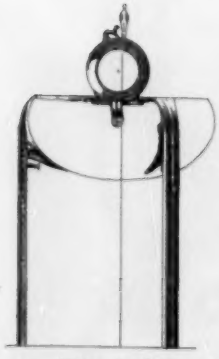


FIG. 11. Tripod of Geometric period from Ithaca (*BSA* 35 [1934-35] fig. 17)

FIG. 10. Bronze belt from Este, second stage, second period (Montelius, *op. cit.* I, 1, pl. 52, 1)

FIG. 12. Tripod handle and clamp from Olympia (*BSA* 35 [1934-35] pl. 18, 6)

FIG. 13. Bronze pail with two-piece tee clamps and free-swinging handles from Benacci II (Montelius, *op. cit.* I, pl. 81, 7)

FIG. 14. Clamp from cauldron with griffon heads, Vetulonia, Circle of the Cauldrons (Giglioli, *L'Arte Etrusca*, pl. VI, 1)

FIG. 15. Basket or pail with clamp of bird with outstretched wings. Layard, *Nineveh* II (1850) 305

FIG. 19. Bronze Egyptian pail of Saite period (*JNES* [1947] No. 3, pl. VI)

FIG. 16. Cauldron attachment from Olympia (*BSA* 35 [1934-35] pl. 20, 4)

FIG. 17. Phoenician bowl from Rhodes (P. Poulsen, *Frühgriechische Kunst*, fig. 86, p. 87)

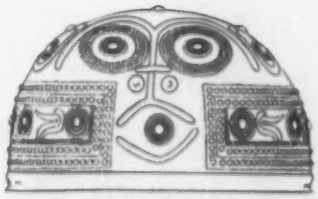


FIG. 18. Face helmet with border of stylized disk-duck design (Giglioli, *L'Arte Etrusca*, pl. IV, 1)

FIG. 20. Pilgrim bottle from Corneto (Montelius, *op. cit.* II, 2 pl. 282, 13a)

FIG. 25. Breast strap of horse with embossed ornament from Nineveh (Layard, *Second Expedition*, 178)

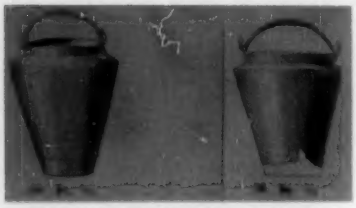


FIG. 21. Pails from the Circles of Pelliccie (Montelius, *op. cit.* II, 2 pls. 195, 28 and 196, 26)

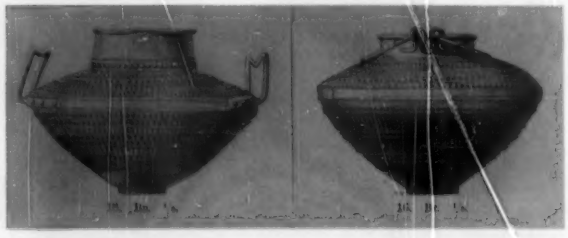


FIG. 22. Vertically collared vessels from the Montarano tomb of Falerii (Montelius, *op. cit.* II, 2 pl. 307, Nos. 16 and 18)

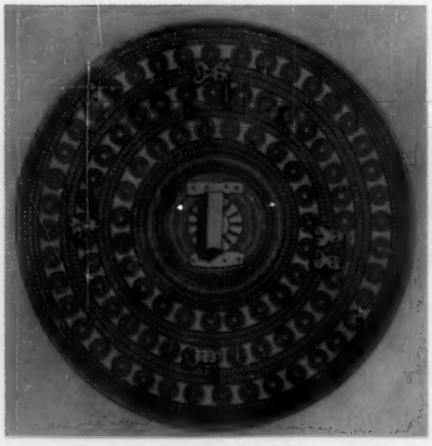


FIG. 24. Round bronze shield from the Warrior tomb (Montelius, *op. cit.* pl. 287, 6a)

FIG. 23. Pail from the Bocchoris tomb with cartouche of the Pharaoh (Montelius, *op. cit.* II, 2 pl. 295, 14)

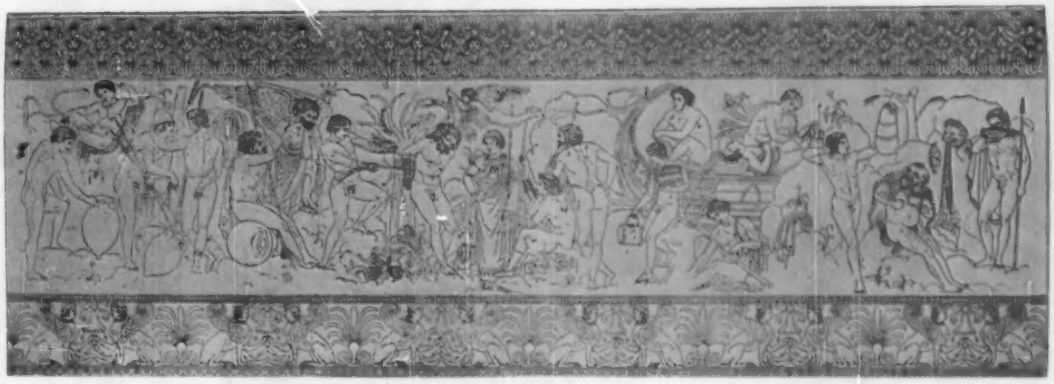


FIG. 1. Cista Ficoroni

FIG. 2. Attic kalpis

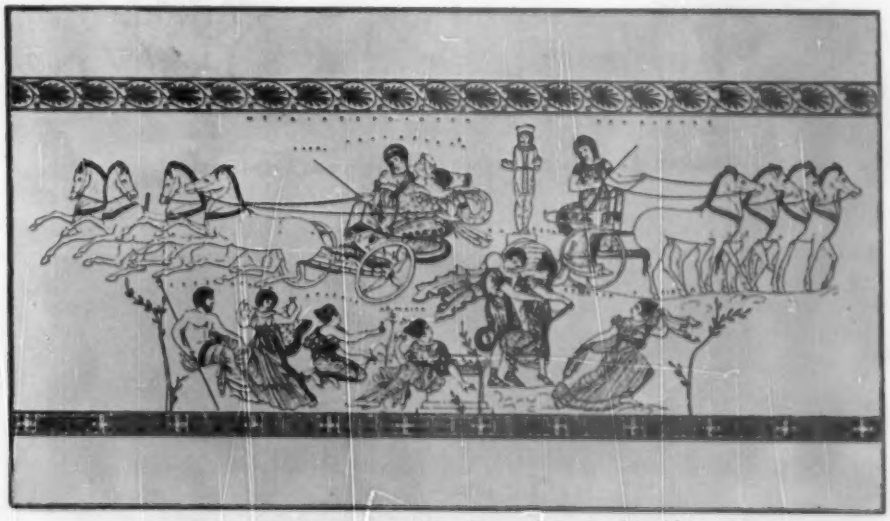


FIG. 7. Meidias Painter: The Rape of the Leukippidae

FIG. 3

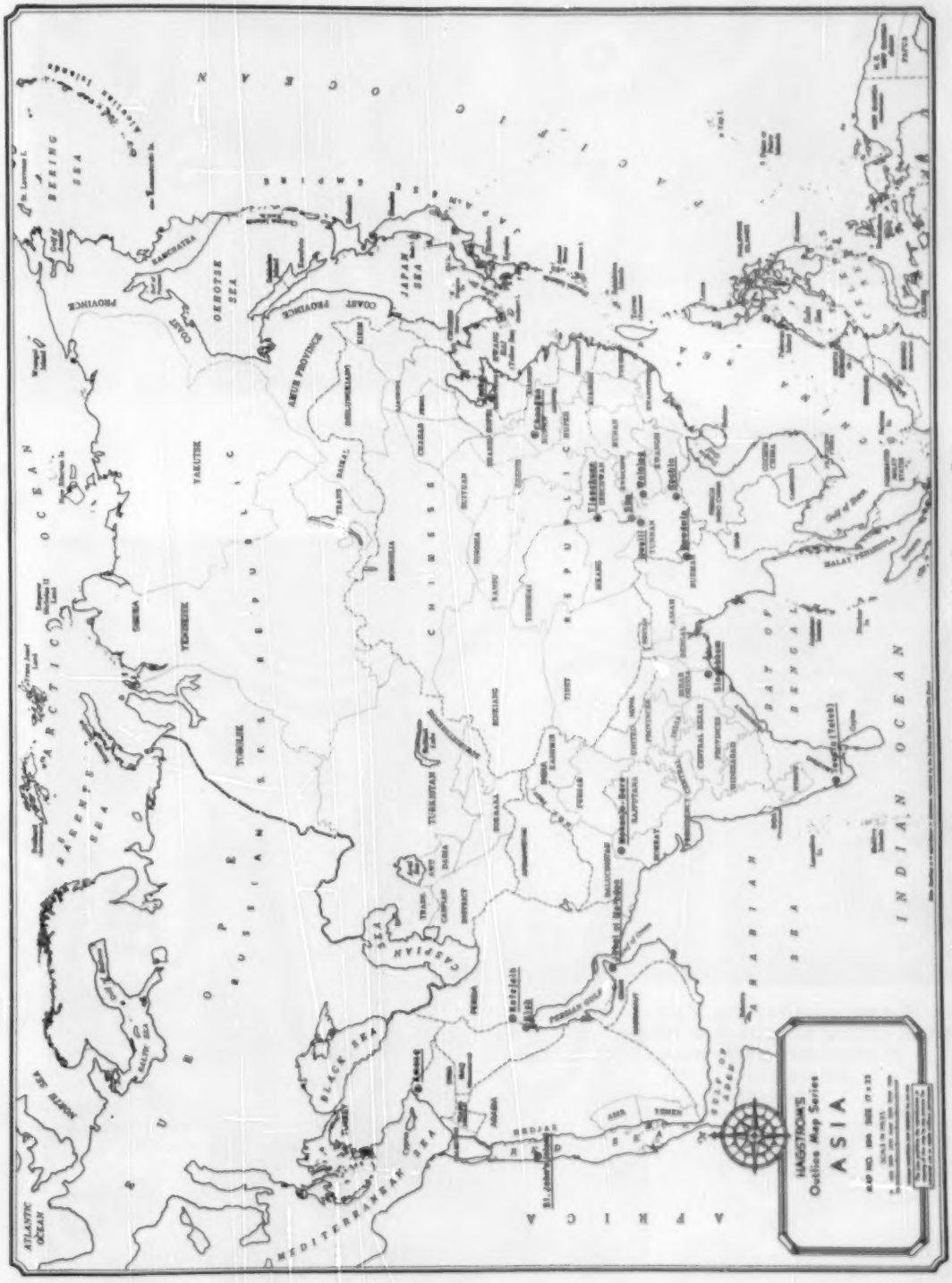
FIG. 4

FIG. 5

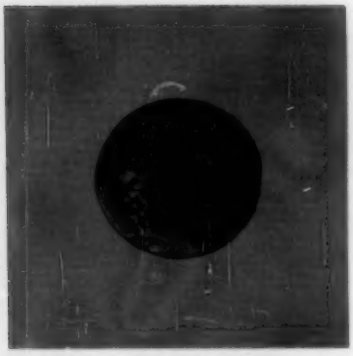
FIG. 6

Etruscan mirrors with combat of Amykos and Polydeukes

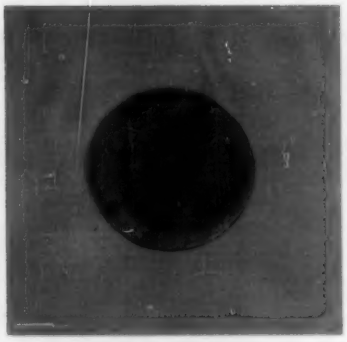
FIG. 8. Meidias Painter: The Death of Talos




Courtesy of the Hagstrom Map Company, Inc.



1 a. Obverse: Head of Apollo r., laur.



1 b. Reverse: ΒΑΣΙΛΕΩΣ ΕΥΘΥΔΗΜΟΥ Tripod-lebes.

FIG. 1. Cupro-nickel Bactrian coin of Euthydemus II
(Inco specimen, actual size)

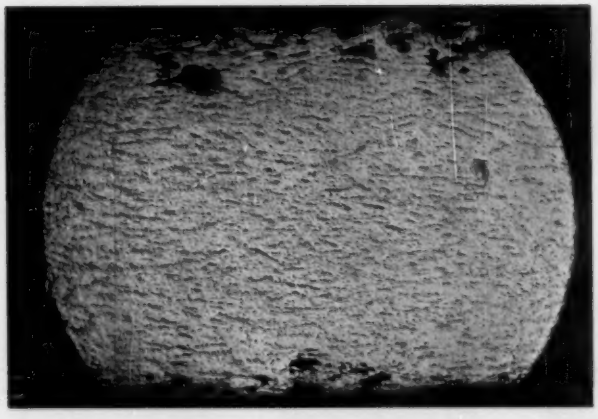


FIG. 2. Photomicrograph of edge of cupro-nickel Bactrian coin at 25 diameters, showing elongated grain structure and a corrosion depth of 0.008-0.012" (Euthydemus II, Inco specimen)

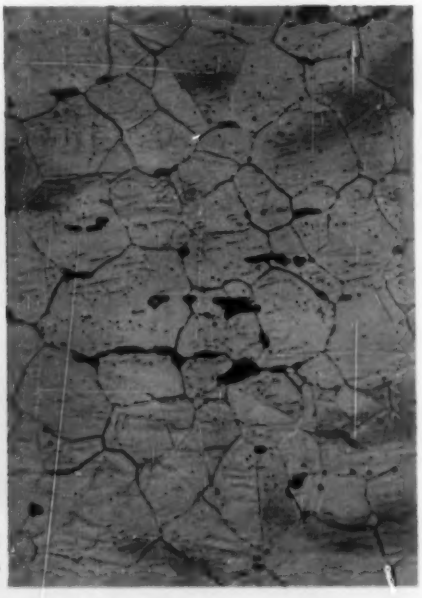


FIG. 3. Photomicrograph of cupro-nickel Bactrian coin at 250 diameters, showing grain structure, strain lines, and patches of copper oxide. Cyanide-persulfate etch.
(Euthydemus II, Inco specimen)

FIG. 1. Samson and the lion

FIG. 2. Christ and the Samaritan woman

FIG. 3. Demonstration in Anatomy

Rome, catacombs near the Via Latina, courtesy of the Rev. Father A. Ferrua, S.J.

FIG. 5. Pompeii: southern street of tombs, seen from northeast

FIG. 6. Pompeii: three tombs on opposite, northern side of highway
FIGS. 4-6. Courtesy of A. Maiuri

FIG. 4. Pompeii: Nuceria Gate reconditioned by Administration; each side of entrance, stone facing of pre-Roman City Wall

FIG. 7. Minori: decorated room in Second Villa, courtesy of P. C. Sestieri

FIGS. 8 and 9. Cornices decorated in relief

FIG. 10. Antefix with female head

FIG. 11. Sheathing of ridge-beam

FIG. 12. Pedimental disk: Herakles and the Nemean lion

FIGS. 8-12. Fratte di Salerno, Early Hellenistic Temple, photographs by the Laboratorio Fotografico, Museo Provinciale of Salerno, courtesy of V. Panebianco

FIG. 13. Fratte di Salerno: equipment of Samnite tomb

FIG. 14. Sala Consilina: equipment of burial in archaic necropolis

FIGS. 13-14. Photographs by the Laboratorio Fotografico, Museo Provinciale of Salerno, courtesy of V. Panebianco

FIG. 16. Paestum: Roman portico, new museum in distance, courtesy of P. C. Sestieri

FIG. 15. Padula: marble torso from the Asklepieion, photograph by the Laboratorio Fotografico, Museo Provinciale of Salerno, courtesy of V. Panebianco

FIG. 17. Marble statuette of triton

FIG. 18. Marble head of a Julio-Claudian princess

FIGS. 17-18. Paestum, courtesy of P. C. Sestieri

FIG. 19. Foundations of temple on Acropolis

FIG. 20. Enclosing wall, east side of Temenos of Acropolis

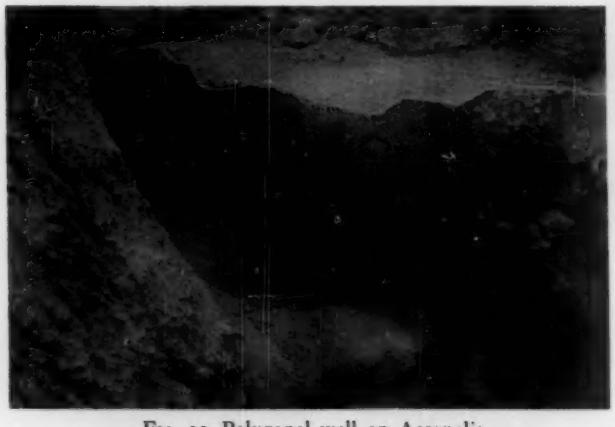


FIG. 23. Polygonal wall on Acropolis

FIG. 21. Base with inscription to C. Iulius Naso

FIG. 22. Archaic terracotta antefix of local make

FIGS. 19-23. Velia, courtesy of P. C. Sestieri

Fig. 24. Manduria: left to right: the most ancient wall with its surrounding moat (filled with earth and now excavated at one point only); the second wall, of extremely regular construction, set inside the original moat; the third, most recent, wall, far more imposing, with its own great moat. Figs. 24-26, courtesy of N. Degrassi

Fig. 25. Manduria: detail of inner face of most recent wall

Fig. 30. Halaesa: excavations of 1956: stretch of western portico of Agora, courtesy of G. F. Carettoni

Fig. 26. Canosa, S. Aloia: façade of underground tomb, detail of painting

FIG. 27. Portion of circuit of wall

FIG. 28. A *Fondo di Capanna*

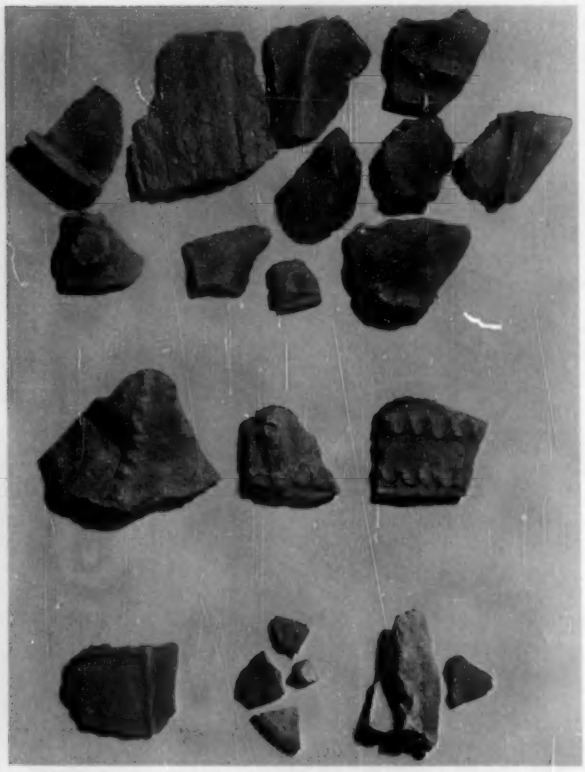


FIG. 29. Fragments of clay vessels of Apennine types

FIGS. 27-29. La Capriola near Bolsena, courtesy of J. Bayet

FIG. 31. The Heraian Hybla: burial *a cassa*, courtesy of A. Di Vita

FIG. 39. Populonia: two Late Etruscan oinochoai, courtesy of G. Caputo

FIG. 32. Gela, Acropolis: statuette of a Kriophoros, 4th century B.C.

FIG. 34. Gela, Acropolis: clay head of Demeter or Kore, close of 5th century B.C.

FIG. 33. Gela, Acropolis: gorgon antefix, 5th century B.C.

FIG. 35. Monte Bubbonia: equipment of burial, second half of 6th century B.C.

FIGS. 32-35. Courtesy of D. Adamesteanu

FIG. 36. Monte Bubbonia: hydria of local make, 6th century B.C.

FIGS. 37-38. Vassallaggi, the necropolis: two vases, one of local make, the other an Athenian importation
FIGS. 36-38. Courtesy of D. Adamesteanu

*Book Reviews, continued*


Bousquet, *Le Trésor de Cyrène* (William B. Dinsmoor) ..... 402

Karnitsch, *Die verzierte Sigillata von Lauriacum (Lorch-Enns)* (Howard Comfort) ..... 411

Picard, *Catalogue du Musée Alaoui. Nouvelle Série (Collections Puniques) Vol. I* (Margarete Bieber) ..... 412

Willey (ed.), *Prehistoric Settlement Patterns in the New World* (Catharine McClellan) ..... 414

Gladwin, *A History of the Ancient Southwest* (Erik K. Reed) ..... 415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The Gennadius Library of the American School of Classical Studies in Athens is anxious to encourage the use by scholars of its unusually rich resources for the study of the history, literature and civilization of mediaeval and modern Greece. The collection is especially rich for the Byzantine, Frankish and Turkish periods and for the Greek War of Independence, and the library also provides valuable reference material for research on the Near East in modern times. The collection of works of travel in the Levant is a very complete one. The library offers excellent facilities to scholars who have been awarded travelling fellowships and provides opportunities for association with Greek scholars. All visitors to Greece are welcome to use the library, and whenever it is possible the Librarian, Dr. Peter Topping, will be glad to furnish bibliographical information concerning the rare items in the collection. Address: Dr. Peter Topping, Gennadius Library, Athens 40, Greece.


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Current Anthropology. The Wenner-Gren Foundation for Anthropological Research announces with pleasure the inauguration of a series of publications to be called current anthropology. The series, to be edited for the Foundation by Dr. Sol Tax of the University of Chicago, will continue a program begun with the publication of anthropology today: an encyclopedic inventory, and with the yearbook of anthropology. These publications are intended to inventory knowledge in various fields of anthropology and to keep this knowledge up to date. current anthropology similarly will publish a new collection of "inventory" articles every two years. These new articles, and revisions of the earlier articles, may be republished in six or eight years as a much enlarged and updated new edition of anthropology today.

## GENERAL MEETING 1957

The fifty-ninth General Meeting of the Archaeological Institute of America will be held in conjunction with the Annual Meeting of the American Philological Association on December 28-30, 1957, at the Statler Hotel in Washington, D.C. Inquiries should be addressed to the General Secretary, Archaeological Institute of America, 608 University of Cincinnati Library, Cincinnati 21, Ohio.

SUBSCRIPTIONS: With Volume 62, No. 1 (1958) the subscription price of the American Journal of Archaeology will be raised to $10. per year and $2.75 per individual copy (both foreign and domestic). We make this change, regretfully, because the costs of production and distribution have, over the last few years, greatly increased.

ABBREVIATIONS AND STYLE: A revised list of abbreviations and a brief style sheet will be printed in the Journal early in 1958.

AAAS AFFILIATION. The Archaeological Institute of America, which became an associated society of the American Association for the Advancement of Science in 1925, has had its status changed to an affiliated society. This means that the Institute will have representation on the AAAS Council and will take part in the government of the AAAS.

Individuals are also invited to join. Members of the AAAS enjoy not only the important benefit of participating in the one organization that represents all branches of science and scientific interest, but also the privilege of obtaining AAAS Symposium Volumes and the Association journals, *Science* and *The Scientific Monthly*, at reduced rates. Those interested should write Dr. R. L. Taylor, AAAS, 1515 Massachusetts Avenue, N.W., Washington, D.C.

AMERICAN RESEARCH CENTER IN EGYPT. Fellowships of $5,000. for study in Egypt, made possible through a grant to the Center from the Bollingen Foundation, have been awarded for 1957-1958. These are the first of a series to be awarded annually for three years. Applications for 1958-1959 should be submitted to the Executive Secretary, Mrs. Elizabeth Riefstahl, P.O. Box 27, South Essex, Mass., before March 1, 1958.